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A study of enhanced and interactive online communication service : focusing on e-mail interface

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A study of enhanced and interactive online communication service

Focusing on E-mail interface

by

Sang-Duck Seo

A thesis submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Graphic Design

Program of Study Committee:

Roger Baer, Major Professor

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2006

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This is to certify that the master's thesis of

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has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy

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ABSTRACT

Application of online communication services such as e-mails, e-cards and instant messaging are very useful tools as nonverbal communication for online users. Computer technology has been developing powerful engine tools to be able to convey messages using various methods. Although e-card and instant messenger in online communication services have developed significantly in both visual and functional approaches, it was discovered that e-mail hasn't improved much even though the number of users has significantly increased compared to other services.

The purpose of this study is to improve e-mail service both visually and interactively. This research is specifically focused on proposing a new environment for an e-mail program. "Incoming and outgoing" shows a great interaction between sending and receiving messages based on organized interface and functions. "Outgoing" is significantly improved and more useful for creating various types of messages. For instance, the user can create messages in terms of different interface environments depending on the formal or informal types of messages. Moreover, the user can classify e-mail into different categories such as personal, business and short memos. There is another consideration with creating kinetic messages in order to make them more personal and unique based on e-card service. In addition, the user can express messages by using kinetic typography based on different typefaces, colors, sounds, and motions. These elements are basic and simple categories in order to be able to create dynamic text messages. The prototype design shows different application tools for online users allowing them to create messages with multiple options. Thus, this research will address potential online communication services in the future.

CHAPTER 1. INTRODUCTION

This research paper consists of four chapters. Chapter one, INTRODUCTION, provides the purpose and methodology of thesis. Chapter two, THE LITERATURE REVIEW, summarizes the history, environment and different forms in online communication. It contains analysis of different types of e-mail applications and environments. Chapter three, DEVELOPMENT OF E-MAIL APPLICATION ENGINE, shows how to improve the e-mail application in terms of different factors: functional and visual improvements. Chapter four, CONCLUSION AND DISCUSSION, closes this research with conclusion of research tasks and questions. The methodology of this study begins with an analysis of online communication to understand, prove and define online communication.

A. Thesis Objectives

The term ‘online communication’ refers to reading, writing, and communication via networked computers.¹ It has become the most essential application tool among the computer generation leading to a high-tech life style. Online communication consists of the users’ ID, Internet access and computer equipment in order to interact with other users. High-speed internet service provides a variety of ways to use different communication programs such as IM (instant messaging), e-mail, e-card, message board, etc. It is much faster and easier to contact a person, especially for long-distance exchanges.

¹ Warschauer, M. (2001)., Online Communication, In R, Cater & D. Nunan (Eds.), *The Cambridge guide to teaching English speakers of other languages* (pp. 207-212). Cambridge: Cambridge University Press.

Human Computer Interaction (HCI) has been focusing on many methods of online communication to make it easier and more convenient for users. Many researchers and designers in both industry and academia have continuously focused on online communication engines in order to make better interaction between users. One of the representative examples is Instant Messaging (IM) service such as Yahoo, AOL, MSN, etc. According to ‘Interaction and outeraction’², IM was more like a communicative processes people used to connect with each other and to manage communication, rather than personal information exchange in the last five years.

However, Instant Messaging (IM) has been developing its functions and interface for visual expression, not just for conversation, which gives users more options to be able to convey their personal expressions. For example, ‘Emoticon’ became such a powerful expression tool in chatting services. Emoticon with its symbolic message can express human emotions and behaviors along with text messages or without it. Each different symbol contains short messages and keeps creating a new symbol to make abstract meaning in communication.

Beyond this contemporary IM environment, some researchers have already begun to invent a new method for online chatting services. For instance, the Human Computer Interaction Institute at Carnegie Mellon University has been focusing on animated and dynamic text services in IM. It has been proved in many ways that animated and time-based dynamic text shows greatly improved personal expressions based on human emotions. This service can provide more joyful and diverse text presentation in online communication.

² Bonnie A. Nardi, Steve Whittaker. (2000), “Interaction and Outeraction: Instant Messaging in Action”, Presented in CSCW, Philadelphia, PA

Paper and researches are increasing for this study focused on 'Kinetic Engine' for online communication. However, most e-mail messages usually contain text, but the user can also send non-text files, such as graphic images and sound files as attachments. One example of an e-mail term is the exchange of computer-stored messages by telecommunication.³ E-mail accounts for a large percentage of the total traffic over the Internet. An e-mail address is easily identified by the '@' symbol, for instance sdseo@iastate.edu, making identification of the domain it's attached much easier.

In various types of online communication services, there are still weaknesses in the methods and environment of e-mail services. In the online communication environment, e-mail and e-card services are not sufficient for creating and conveying each personal message. Even though e-card services have been around for over ten years, there are limited options to create animated text messages or static messages without containing more personal aspects.

When using e-card services, users must have a different ID or user name and password to log in from different online services. Using both e-mail and e-cards is inconvenient and also not very interactive for a functional environment. In terms of the user's different purposes of using online communication services, the method of expressing contents also needs to have more variety in order to express the user's personality, emotions and tone of voice in both e-mail and e-card services.

The main purpose of this research is to improve the interface design of e-mail programs, making a more powerful engine tool to create various types of messages for online users. The problem of current e-mail programs for online service is that they do not provide

³ Fluvius. Web design agency homepage. 13 October 2005
<http://www.fluvius.co.uk/faq_glossary/glossary.htm>

various interfaces in a functional and visual environment. For instance, when users receive messages from others, there is no distinctive identification using graphic elements such as colors or symbols. Also there are not many choices to create different messages for various types of purposes. Diverse functional structures for an e-mail environment can be utilized to make it better and more useful by providing both interactive interfaces and functions from the advantages of e-mail and e-card environment. In addition, this study will improve and enhance better communication methods by using kinetic typography based on human emotions. We need to provide better interface and greater expressive communication in order to satisfy users' high expectations and to help users create their personal messages. This research will attempt to demonstrate the possibilities for creating a new online communication method for e-mail in order to facilitate better communication between users.

The following are questions to improve and to solve problems in the environment of the e-mail program we use currently:

1. What are the main disadvantages to current e-mail programs?
2. What is needed to develop an e-mail environment for both functional and visual aspects?
3. How can users manage their incoming messages more easily?
4. What are the possible solutions to reducing the number of e-mails we get everyday?
5. How can users create their messages for different purpose such as personal, business or short memos (instead of making phone calls)?

B. Methodology

This study proposes a new environment for an e-mail program for enhanced and interactive online communication in the future. Methodology of this research includes research and analysis of online communication programs and prototype.

1. Research

Various types of research and papers related to online communication will be discussed to bring out the objectives of this study. The research helps to understand the current situations of the online community and users. In this step, the survey data and research in both design and theoretical statements will support and show the direction of this research.

2. Questions

- a. Does communication in online service always provide you with a good enough environment to convey your emotional messages compared to contact in a real environment?
- b. Do you feel that is it much like real communication when you have messages through the online environment?
- c. Is that enough to express your emotions based on only text messages without verbal tones of voice, facial expressions or even your gestures?

These questions give people the idea that we miss something important in the online community. There are still potential possibilities to improve the online communication. All of these issues need to be considered to provide online users with a better interactive environment in online communication.

3. Analysis of online communication programs

Examples of several popular online communication programs as examples will be analyzed to discover both the advantages and disadvantages in the interaction of the communication methods. This is an important task to comprehend many factors for improving its functions and interface. Understanding other online communication tools and methods helps this study improve and create a new environment of online communication. The common problem or weakness of the e-mail environment will be discussed in order to improve its functional and visual aspects. This study will also explain how the e-mail programs we use now need to be improved for the different purposes in online communication services.

4. Prototype

Developing a prototype model of a new e-mail program will focus on the interface design and functions for using it easily to enhance interaction between users and computers. The new interface design will be the main focus in order to combine all the advantages and functions in other programs. It is expected that the new e-mail program will enable users to manage both incoming and outgoing messages.

CHAPTER 2. LITERATURE REVIEW

A. Online Communication

1. Overview

Online communication in the 21st century became one of major modality for sharing information, and it is faster than other method. Millions of people around the world are using a computer to e-mail, to chat, to play games, to shop, to search for information, etc.. These activities cannot be separated from our daily life. WWW (World Wide Web) has made it possible to share ideas and information with online users through their communicating messages. Communication occurs through the interaction between humans or humans and computers in our modern society. The term “communication” is defined in a few different statements on the web information, but all include the meaning of “sharing, exchanging and transferring” based on text or visual elements:

1. The exchange of information between two points.⁴
2. The transmission of information, so that the recipient understands what the sender intends.⁵
3. The successful transmission of information through a common system of symbols, signs, behavior, speech, writing, or signals.⁶

However, the term “online communication” refers to reading, writing, and communication via networked computers.⁷ Warshauer states that the method of online

⁴ www.micro2000uk.co.uk/hardware_glossary.htm

⁵ www.welcom.com/content.cfm

⁶ www.doe.mass.edu/frameworks/scitech/2001/resources/glossary.html

communication differs from off-line, but its purpose is the same as sharing information.

Online communication allows people to find information much faster and more successfully in order to save money and time. This speed of communication has increased in value of use through network services within type of online communication also has been various based on different interests in communities. Through different types of communication such as e-mail, e-card, Instant Messenger, bulletin board, etc, sending and receiving information through the online network is an important key for online communication.

2. History

Online Communication dates back to the late 1960s, when U.S. researchers first developed protocols that allowed the sending and receiving of messages via the computer.⁸ This was a great invention for making the world closer, making it possible for people to conduct conversation activities over a long distances.

Online communication first became possible in educational realms in the 1980s, following the development and spread of personal computers. The background on online communication in language teaching and research can be divided into two distinct periods, marked by the introduction of computer-mediated communication in education in the mid-1980s and the emergence of the World Wide Web in the mid-1990s.⁹ In the first period, dating from the mid-1980s, language educators began to discover the potential of computer-mediated communication for language teaching.

⁷ Warshauer, M. Online communication. p 207-212

⁸ Harner, K. and Lyon, M. Where wizards stay up late: the origins of the Internet (New York, Simon & Schuster 1996)

⁹ Warshauer, M. p 207-212

The development and spread of the World Wide Web in the 1990s marked a second period in the use of communication through Web-based chat rooms, bulletin boards, and discussion forums. Since then, the number of computer users has increased dramatically. In addition, the demographic composition of the user population has also changed to include people of all ages, cultures, educational backgrounds, experience and technical skills. From the second period we have invented many different computer mediated communication tools for both individual and group communities. It is true that online communication has changed our life significantly, and we are faced with new technology everyday. Imagining that our day starts and ends with a computer is not a totally different concept anymore.

3. Development

Until development via networked computer technology, the definition of community focused on only verbal communication, face-to-face or on the phone. Since it was difficult to maintain relationships over long distances due to the slowness and cost of communicating, the physical separation from the community often reduced not only contact, but also the strength of a person's membership in the community.¹⁰ From the early 1990s, communication methods on the computer have been rapidly developing and it is a fundamental element for a high-tech society. Both e-mail and a search engines have become especially major activities among online services.

During the period between 2000 and 2005, increased personal mobility and telecommunication system has greatly changed the number of communicators in the United State. The Internet has changed our lifestyles significantly during this period. Rapid

¹⁰ Jones, Q. (1997). Virtual-communities, virtual-settlements and cyber-archaeology: A theoretical outline. *Journal of Computer Mediated Communication*, 3(3)

interaction and communication have had a profound impact on the development of our economy, culture, and society. The networked community has reached not only business to businesses, but also businesses to individuals. This is an accurate modality of the social network from a contemporary scope. In a contemporary society, therefore, most people can't live without e-mail and users who are online during a typical day read and send e-mail at least a couple of times.¹¹ It was proven by a survey the top ten most popular Internet activities in the U.S. in 2000 (see Table 1)¹²:

Table 1. The Top Ten Most Popular Internet Activities in the U.S. in 2000

Activity	% of Internet Users
1. Web-surfing or browsing	81.7
2. E-mail	81.6
3. Finding hobby information	57.2
4. Reading news	56.6
5. Finding entertainment information	54.3
6. Buying online	50.7
7. Finding travel information	45.8
8. Using instant messaging	39.6
9. Finding medical information	39.6
10. Playing games	33.0

¹¹ Wellman, Barry and Haythoronthwaite, Caroline, ed., *The Internet in everyday life*, (MA, Blackwell Publishers Ltd, 2002), p 52

¹² Ibid., p 7

Notably 81.6 percent of Internet users are using e-mail. Fifty-five percent of the American adults who have Internet access go online, and 48 million American are using the Internet for e-mail as their major online activities.¹³ It is obvious that online users using e-mail are becoming more popular for Internet activities. Finding information was still growing in early 2000, in contrast to the small number of activity in IM (Instant Messaging service).

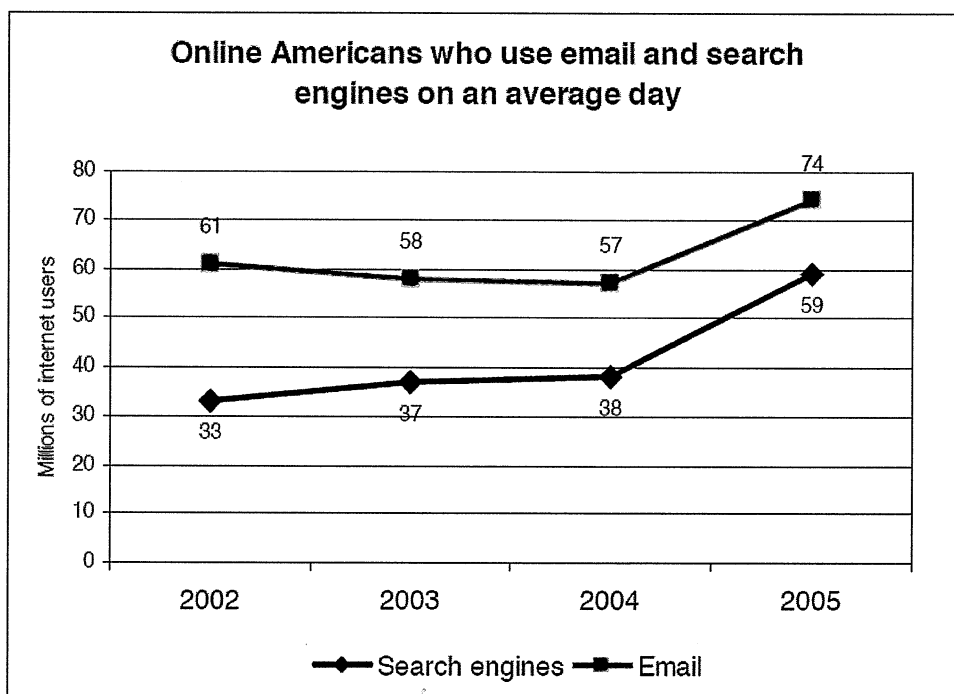


Figure 1. Online Americans who use e-mail and search engines on an average day

The recent survey from Pew Internet & American Life tracking and consumer behavior trends from the ComScore Media Metrix consumer panel however shows a very

¹³ Ibid., p 50

different change from the data in 2000. Figure 1¹⁴ proves how fast the number of e-mail users has increased in the past five years. About 74 million American adults among 80 million Internet users are using e-mail on a typical day in 2005. Compared to the similar numbers between using e-mails and search engines in 2000, figure 1 proves there is a big difference in numbers of users between the search engine and e-mail. It shows an especially big increase between 2004 and 2005: it has increased to 17 million Americans using e-mail everyday. This incredible number shows how important using e-mail is now. Based on the use of computers and accessing Internet web services help, we expect that there will be an increasing number every year.

4. Online Environment: Cyberspace

Computer technology has provided a great communication environment in order to maintain social relationships. As we live together with computers and a media environment in cyberspace, many researchers, scientists, and even designers seek to answer questions about how the Internet is changing our lives, environments, and culture.¹⁵ We also need to consider how the cyber world through the online services has been effective in our life, but also its negative aspects. Even though it has made our life more convenient and better, we are losing as much as we are gaining through the cyber world.

Ongoing conversation through the networked environments requires preparing both a physical environment and users' experiences. The elements of the online environment consist

¹⁴ Lee Rainie and Jeremy Shermak, *Search Engine use November 2005* (Pew Internet and American Life Project) <http://www.pewinternet.org/PPF/r/167/report_display.asp>

¹⁵ Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherdis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 1017-1031.

of modern transportation, increased personal mobility, and the development of modern telecommunications systems.¹⁶ These elements have changed the environments between the physical and virtual space. A few researchers and scientists defined two different types of communication: synchronous and asynchronous.¹⁷ Both appear in the online community in order to enable users to conduct all activities. It is about saving time, as well as convenient and good interaction between users. Over the past 10 years synchronous communication only occurred in communicating with someone face-to-face or by talking on the phone. Online-networked communication transfers perform with different forms in cyberspace, allowing consistent forms and functions even with different programs.

However, ‘cyberspace’ is a new term in our computer society. It defines the Internet network and environment.¹⁸ We as online users or members meet people and talk with them there. This means that spending time on the computer, with the computer-mediated society we live in, is often referred to as Cyberspace¹⁹. Cyberspace combines three things: it has material, symbolic and experiential dimensions.²⁰ David Bell stated that ‘cyberspace includes machines, wires, electricity, programs, screens, and connections, and it is modes of information and communication such as e-mail, websites, chat rooms, etc.’²¹ These are important elements for cyber users in order to contribute to online communities. Online users get together for their same interests and create as a big social group in the cyber world.

¹⁶ Preece, J. and Diane Maloney-Krichmar (2003) Online Communication. In J. Jacko and A. Sears, A. (Eds.) *Handbook of Human-Computer Interaction*, Lawrence Erlbaum Associates Inc. Mahwah: NJ.

¹⁷ Ibid.

¹⁸ Kollock, P. and Smith, M., *Communities in cyberspace*, (London, Routledge, 1999)

¹⁹ Ibid.

²⁰ Bell, David. *An Introduction to Cybercultures*, (New York, NY, Routledge, 2001)

²¹ Ibid. p 1.

Members in a community share goals, interests, needs or activities which provide the primary reasons for belonging to the community.²²

Another element to help define the term cyberspace is the communication method. In cyberspace, different opportunities and chances are provided to enable to meet someone new. There are many web sites providing meetings or finding someone new. Match.com is one of popular sites to have new experiences with someone. 'Match.com estimates it has inspired millions of relationships.'²³ This community site through the online environment is much easier and more successful than verbal communication in offline. Howard Rheingold described online communities as 'cultural aggregations that emerge when enough people bump into each other often enough in cyberspace.'²⁴ Through online communication including instant messaging and e-mail, people in cyberspace have a greater number of chances to meet. Moreover, the world is wide and far, but it is very close in cyberspace. 'Don't be surprised if you discover your co-workers, neighbors, friends and even family members are Match.com members, too.'²⁵ This explains how the world growing smaller with such large number of people living together in cyberspace.

There are more new contents and e-commerce coming out everyday for different purposes or user groups. 'Cyberspace is already the home of thousands of groups of people who meet to share information, discuss mutual interests, play games, and carry out business.'²⁶ We go shopping, talk with people, study and exchange knowledge, make friends,

²² Jones, Q. (1997). *Virtual-communities*, Virtual-settlements and cyber-archaeology.

²³ Match.com. December 5, 2005 < <http://www.match.com/index.aspx?lid=2>>

²⁴ Rheingold, H. (1994). A Slice of Life in My Virtual Community. In L. M. Harasim (Ed.), *Global Networks: Computers and International Communication* (pp. 57-80). Cambridge: MA: MIT Press.

²⁵ Match.com. December 5, 2005 < <http://www.match.com/index.aspx?lid=2>>

²⁶ Bell, David. *An Introduction to Cybercultures*,

and play games from all around the world. People communicate with each other online without considering time, space and expense. They always go back and forth between real and cyberspace. This means people in modern society are living with two different cultures in two different spaces.

In the context of Cyber cultures, Cyborgs is the product of the daily electronic images that it receives, reflects and transmits.²⁷ Moreover, David Hess persuasively argues ‘we can think of most members of urban societies today as at least “low-tech cyborgs”, since our existences are shaped and sustained by computers as well as phones, cars, televisions.’²⁸ As this cyber environment, David Bell asked: ‘how important is it that we realize that we are cyborgs, or understand ourselves as cyborgs? How our lives have to change if we haven’t got a car, or can’t find the network for our mobile phone, or have to take drugs to stay healthy. Or how would we feel if our computer got a virus, or crashed, or was stolen.’²⁹ All these questions are important concepts to think about our future for the next generation. We may not even be able to think of our life without a computer network.

5. Online Community

A recent survey by the Pew Foundation reports that over one-third of all Americans had Internet access in 2001.³⁰ The types of people participating in online communities are changing. Some communities require members to have professional skills or qualifications to

²⁷ Fitzpartrick, T., *Social policy for cyborgs* (body & Society, 1999), p93-116

²⁸ Hess, D., *On low-tech cyborgs*, in C. Grady, ed., *The cyborgs Handbook*, (London, Routledge, 1995)

²⁹ Bell, David, p150

³⁰ Rainie, L., & Packel, D. (2001). *More online, doing more*. Washington, DC: Pew Internet & American Life Project.

be involved, but there are also millions of the communities for anyone sharing ideas or information.

In 1996, a multidisciplinary group of academics held a workshop at which they identified the following core characteristics of online communities:³¹

- Members have a shared goal, interest, need, or activity that provides the primary reason for belonging to the community.
- Members engage in repeated, active participation and there are often intense interactions, strong emotional ties and shared activities occurring between participants.
- Members have access to shared resources and there are policies for determining access to those resources.
- Reciprocity of information, support and services between members is important.
- There is a shared context of social conventions, language and protocols.

These significant identifications of online communities reflect on our modern society in different ways. Meeting someone in a situation of physical appearance usually forms social relationships with others. However, those members in an online community have a chance to meet other members as ‘weak-tie relationships.’³² These weak-tie groups contain people that share some common interests but do not rely on each other for strong emotional

³¹ Whittaker, S., Issacs, E., & O’Day, V. (1997). Widening the net. Workshop report on the theory and practice of physical and network communities. *SIGCHI Bulletin*, 29(3), 27-30.

³² Granovetter, M. (1982). The strength of weak ties: A network theory revisited. In P.M.N.Lin (Ed.). *Social Structure and Network Analysis*. (pp. 105-130). Beverley Hills: CA: Sage.

support, regular daily or weekly help. While the Internet helps to support strong ties, such as those between family members, it is particularly good for weak-tie relationships.³³

According to ‘communities of practice’³⁴, communities for professionals and others who share knowledge and resources are distinguished by special interests and support. The members in these communities share their ideas and offer professionals emotional support through discussion.³⁵ Another kind of community is physical communities that are supported by an online network, known as community networks to distinguish them from communities that primarily exist online.³⁶ These community networks usually focus on neighborhood issues, and the online communication supplements face-to-face meetings. In our modern society, many people meet these people both online and offline as well.

³³ Wellman, B., & Gulia, M. (1999a). Net Surfers Don’t Ride Alone. In B. Wellman (Ed), *Networks in the Global Village* (pp. 331-336). Boulder, CO: Westview Press.

³⁴ Wenger, E. (1998). *Communities of practice*. Cambridge, UK: Cambridge University Press.

³⁵ Carroll, J. M., & Rosson, M. B. (2001). *Better home shopping of new democracy? Evaluating community network outcomes*. Paper presented at the CHI 2001, Seattle, WA.

³⁶ Cohill, A. M., & Kavanaugh, A. L. (1997). *Community networks: Lessons from Blacksberg, Virginia*. Norwood, MA: Artech House

B. Online Communication Methods

1. Overview

Method of online communication have appeared in various forms, and with many functions. This chapter focused on the differences between synchronous and asynchronous communication and discusses what direction we need to move in. Many companies related to computer technology such as Apple, Dell, IBM, Microsoft, etc. have revealed many useful interactive programs for the online network community. There are also numerous businesses for new online services being created every day.

The interactive network between instant messaging and telephone text communities is also gaining popularity, especially with teenagers who like to keep in contact with friends while moving from location to location. However, mobile telephones continue to be the medium most used to contact friends and relatives, except for far-away friends where e-mail predominates. It is a fact that using e-mail and online communication because it is more convenient and less expensive is prevalent among the younger generation. In addition, 'E-mail is used more to contact friends than relatives, regardless of distance.'³⁷ This supports the survey of e-mail users in America that some 59 percent of those who use e-mail to communicate with their families, communicate more often now with their primary family contact, and 60 percent of those who e-mail friends say the same thing about increased communication with their primary friend contact. About 31 percent of family e-mailers have started communicating with a family member that they had not contacted much before.³⁸

³⁷ Wellman, Barry and Haythoronthwaite, Caroline, p 96

³⁸ Ibid., p 67

However, we can see that many teenagers switch effortlessly between media, text, e-mailing, and chatting. Chatting and sending messages online is becoming a normal part of many people's lives, particularly for young people. 'Online people do almost everything that people do when they get together, but they do it with words on screens leaving their bodies behind independent of local time or location.'³⁹ This shows a great development of communication forms and online users' satisfaction, but we can also think about the communication forms compared to off-line experiences.

According to all the research of online communication from the beginning of this study, I believe that there would be many possible and potential methods and ideas by developing its technology and environment. Ten years ago, not many people believed that we would communicate with people simultaneously from all around the world. In a computer-mediated society, in areas such as other cultures, life and communities that this researcher discussed earlier, it would make communication forms and our communities much better. There would be an additional benefit of more enjoyable activities.

Applications are overloaded and users sometimes get confused with new interfaces and functions. James said that technology empowers us and frustrates us; it simplifies and complicates our lives.⁴⁰ People face difficulties with using new programs that require having experiences and knowledge from the users. The functions for the many tasks found on many programs have made them complicated, with interface that often confuse the users.

According to James's statement that 'A well-designed interface recognized the courses of action users are most likely to take and makes those interface elements easiest to access and

³⁹ Rheingold, H., *The virtual community*. Homesteading on the electronic frontier: Reading, (MA, Addison-Wesley Publishing, 1994)

⁴⁰ Jesse J. Garrett (p 7), *'The Elements of User Experience'*, AIGA, NY: New Riders.

use,⁴¹ we should take it consideration the major elements for different purposes of online communication.

The major elements of online communication methods consist of text, voice and visual. For communicating through the online network, text messaging is the major method in order to communicate with other users in online communities. Communication activities such as e-mail, e-cards, instant messenger and bulletin board all have different forms for transferring one's ideas and information. All of these communicating methods depend on different type of communication.

2. Synchronous Communication

Synchronous communication occurs in real time conversation. Online communication such as voice and video chat is commonly performed as a great interaction through the online network. It became a great tool to use for certain situations: business conferences and personal contact over a long distance.

a. Instant Messaging (IM)

As synchronous communication in the online network, Instant messaging (IM) presents real-time communication with users from all around the world. It certainly provides various interactive functions such as chatting, talking, sending, receiving, playing, etc. The number of people using IM has gradually increased among online users, especially teenagers who like to keep in contact with friends and family while they are moving from one place to another. This application provides not just a text messenger, but video chat services. Large

⁴¹ Ibid (p120)

number of IM users are increasing their mobile communication as well. This phenomenon is made possible by good interaction between the mobile and online networks.⁴²

A few online services such as AOL, MSN, Yahoo, iChat, etc., also have video and audio communication services (see Figure 2⁴³ and Figure 3⁴⁴).

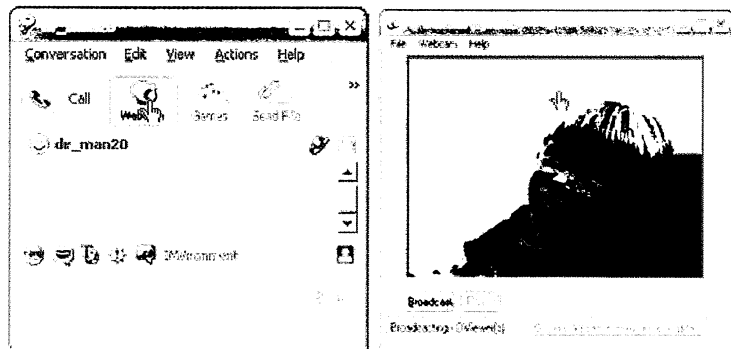


Figure 2. Web cam and video service (Yahoo IM)

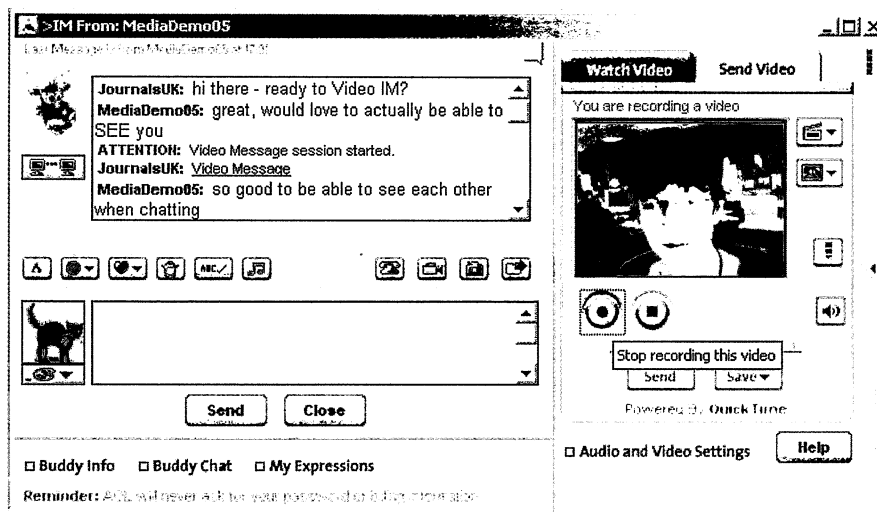


Figure 3. Web cam and video service (AOL)

⁴² Microsoft Corporation, 16 November 2005

<<http://www.microsoft.com/mac/default.aspx?pid=msnmessenger>>

⁴³ Yahoo Instant Messenger Service, 20 November 2005. <<http://messenger.yahoo.com/features.php>>

⁴⁴ AOL Instant Messenger Service, 20 November 2005, <<http://www.aol.co.uk/graphics/about/press>>

Even mobile networks such as telephones and PDAs provide mobile communication with video or text messaging services. There is another example with various network services for Instant Conversation provided by Microsoft Online Network Service. (see Figures 4, 5, 6, 7, 8, 9 and 10)⁴⁵

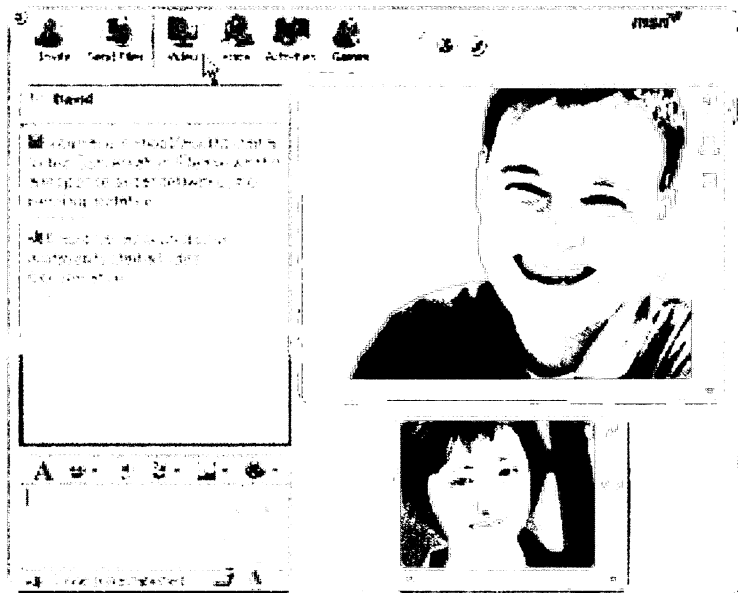


Figure 4. Video Conversation (MSN)

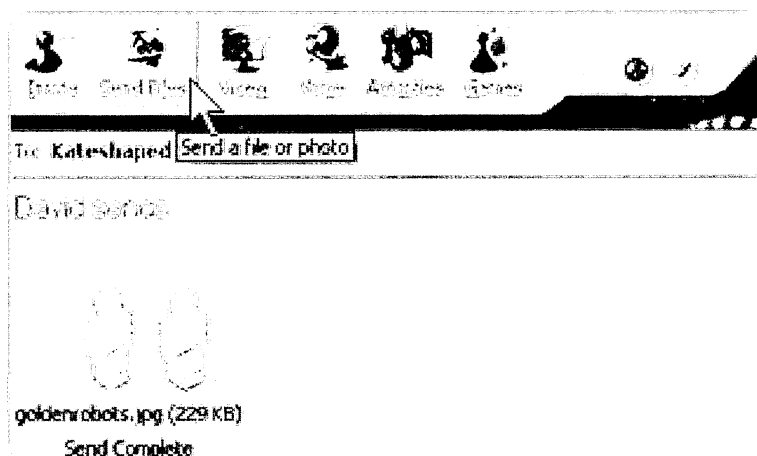


Figure 5. Instant Sharing (MSN)

⁴⁵ Microsoft Online Service November 16, 2005 <<http://join.msn.com/messenger/features>>

Figure 4 shows a video conversation in which users can see and hear each other in real time while they are chatting. Instant sharing from Figure 5 explains that people can send and receive files between users.

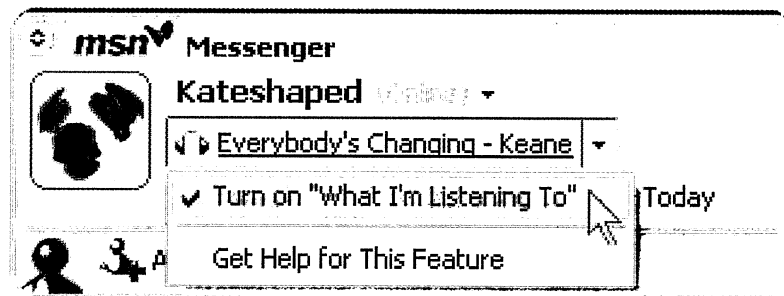


Figure 6. Music Service (MSN)

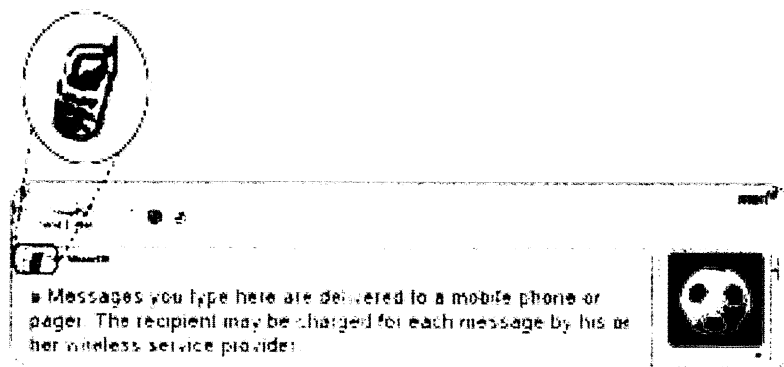


Figure 7. Mobile Phone Network (MSN)

Music service (Figure 6) shows contacts what you're listening to. Users can display the name of the song currently playing next to other users' names in their contact lists. Mobile phone network (Figure 7) enables users to send any text messages even when the other users are offline. As mentioned earlier, this shows a great high-tech communication form between PC and mobile phones. Figure 8, voice conversation, brings only voice conversation based on a high quality network. This replaces the phone services, resulting in

conversation over long distances with expectations of saving money, but it is undesirable for users being online to talk at the same time.

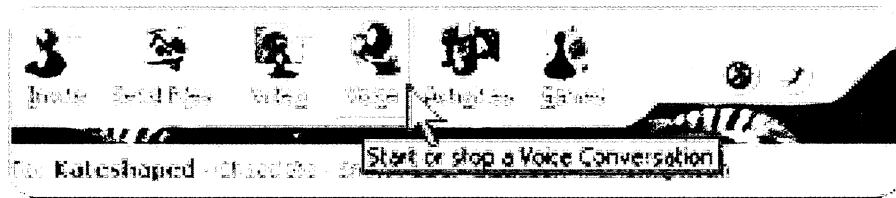


Figure 8. Voice Conversation (MSN)

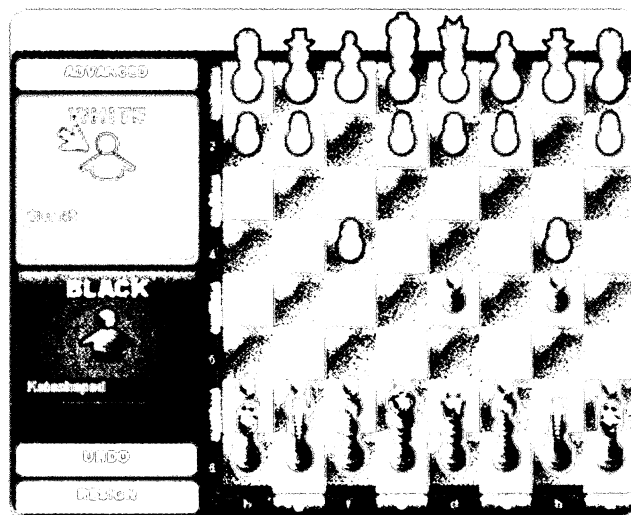


Figure 9. Play Game (MSN)

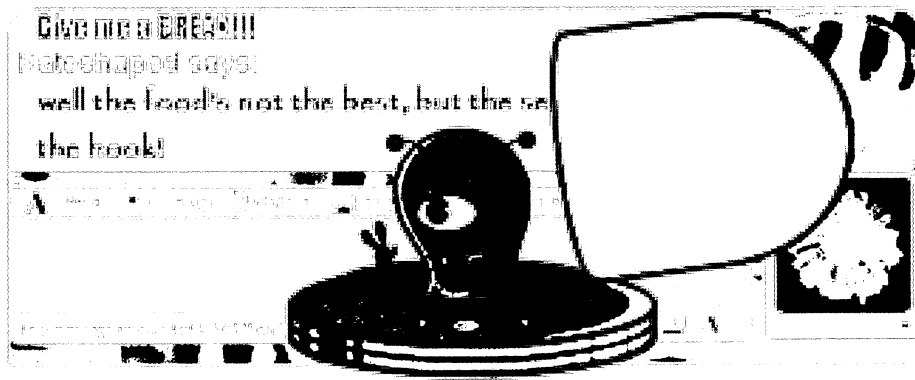


Figure 10. Animated Expression (MSN)

IM (Figure 9) provides more activities for users such as playing games and expressing animated illustration, emoticon, wink, as well as one's own personal display image (Figure 10).

b. Advantages & Disadvantages

Instant messaging (IM) has both advantages and disadvantages for users. Even though earlier discussion explained that video chat provides a great interactive environment regardless of the long distances and saving time or money for physical appearances, there are still weaknesses which prevent users from communicating successfully. For instance, video chat has a problem with conveying some non-verbal information (body language, facial expressions, tone of voice). It effected the screen size and resolution, subtle body language, and important contextual information about a participant's moods. This makes the context and environment of the communication lost to the participants.⁴⁶ Therefore, we are not completely satisfied with synchronous communication.

In addition, there are not many people using video chat compared to people communicating based on text. There are several reasons why people prefer communication by text rather than video chat. To communicate with one another, both users in an individual or group should be online at the same time. And users also need a cam and high-speed Internet connection for the chat environment. Also, Sherry Turkle reports that people who lack confidence in face-to-face situations often become more confident online and lose their inhibitions.⁴⁷ She documented many cases of this phenomenon and explained how people explore new personas online in which they act-out facets of their personalities that are

⁴⁶ Olson, G. M., & Olson, J. S (2000). Distance Matters. *TOCHI*.

⁴⁷ Turkle, S., Life on the screen: Identity in the age of the Internet. (New York, Simon & Schuster, 1995)

problematic in face-to-face situation.⁴⁸ This is a case for people who are shy or worry about how they are looked upon by others. These are characteristics difficult to reveal face-to-face and hard to communicate with someone new in a personal setting.

In contrast to this issue, there are different user groups who are very positive using this communication method. For people who have a long distance problem in communicating with their business or family, video chat makes it possible to communicate face-to-face. 'In online textual environments, people represent themselves through their words, and both syntax and semantics convey meaning.'⁴⁹ However, in terms of nonverbal cues online, people are missing important messages such as body language, facial expressions, and voice tone when people communicate via narrow bandwidth media such as text. Moreover, Olson & Olson insist that all technologies have strengths and weaknesses, which developers need to understand.⁵⁰ Therefore, this study will use this advantage in order to apply and develop the prototype of functions and interface for the e-mail program.

c. Emoticons

The term emoticons is a combination of the words emotion and icon.

Emoticon=emotion + icon: A conflation of "emotion" and "icon".⁵¹ The invention of emoticon has changed the method of communication from previous chat programs. The new method of using these emoticons has made users not only enjoy their chatting with text, but also the animation graphics provide users more interest with visual attraction.

⁴⁸ Ibid

⁴⁹ Jacko, J.A., and Sears, A. (eds) *The Human-computer Interaction Handbook: Fundamentals, evolving Technologies and emerging applications*. (New Jersey, Lawrence Erlbaum Associates, Inc., 2002), p 600

⁵⁰ Olson, G. M., Research on computer supported cooperative work (Chapter 59), In M. Helander, T. K. Landauer, & P. Prabhu (Eds.), *Handbook of human computer interaction* (2nd ed)1997, p1433-1456

⁵¹ Raymond 1996:173-174)

	:)	happy		:-c	call me - New!
	:(	sad		:)]	on the phone - New!
	:)	winking		~X(	at wits' end - New!
	:D	big grin		:-h	wave - New!
	::)	batting eyelashes		:-t	time out - New!
	>:D<	big hug		8->	daydreaming - New!
	:-/	confused		I-|	sleepy
	:x	love struck		8-|	rolling eyes
	:">	blushing		L-)	loser
	:P	tongue		:-&	sick
	:-*	kiss		:-\$	don't tell anyone
	=((	broken heart		[-(	not talking
	:-O	surprise		:O)	clown
	X(	angry		8-)	silly
	:>	smug		<:-P	party
	B-)	cool		(:|	yawn
	:-S	worried		=P-	drooling
	#:-S	whew!		:-?	thinking
	>:}	devil		#-o	d'oh
	:((	crying		=D>	applause
	:))	laughing		:-SS	nailbiting
	:|	straight face		@-)	hypnotized
	/:)	raised eyebrow		:-^o	liar
	=))	rolling on the floor		:-w	waiting
	O:)	angel		:-<	sigh
	:-B	nerd		>:P	phbbbbt

Figure 11. Emoticons (Yahoo IM)

Yahoo Instant messaging (IM) recently serves an optional function enabling users to express their emotions by using emoticons (see Figure 11⁵²). There still might not be enough consideration for these icons to convey personal messages well enough to be understood. In emoticon problems, people identifying with traditional writing norms often said such things, as ‘the words should convey all the meanings’. There is age-old tension between “showing” and “telling,” between pictures and words.⁵³ Mandel and Van der Leun detest smileys:⁵⁴

‘In the dawn ages of the Net, someone decided to transmit emotions through the cunning use of typewriter symbols. These symbols were used to make the intent of the poster clear. The reason for this was that many people felt that they couldn’t express themselves clearly using the twenty-six letters of the alphabet with which Shakespeare created Hamlet.’

The most primitive of these symbols was :-) ☺. This symbol was amusing the first time it was used. Now it is no longer amusing. Nothing can substitute for a clear idea simply expressed. Avoid :-)’s and all associated emoticons...like the plague.

These little icons are composed of clusters of typographic symbols. For instance, a “wink” is composed of a semi-colon, a dash and an end-parenthesis – though it is far less commonly used online than the basic smiley (Smiling face), that is composed of a colon, a dash and an end-parenthesis.

In addition, there is another method to express emotions with written text. This is accomplished by using all capital letters or words similar to the sound, for example, typing “hehe” is also obviously a device to convey a sound, in this case the sound of laughter. The

⁵² Yahoo Instant Messenger Service, 20 November 2005. <<http://messenger.yahoo.com/features.php>>

⁵³ Brenda Danet, *Cyberplay: Communicating Online*, Berg, NY, 2001, p 62

⁵⁴ Thomas Mandel and Gerard Van der Leun, (1996), *Rules of the Net: Online Operating Instructions for Human Beings*, (New York, Hyperion) p92

use of all capital letters, as in “AHH...CHOO!” is a familiar from the comics or is street graffiti, especially when the word is a graphic representation of a sound.

3. Asynchronous Communication

The term asynchronous is usually used to describe communications in which data can be transmitted intermittently rather than in a steady stream.⁵⁵ Unlike synchronous communication, asynchronous communication doesn't require users to participate in the conversation at the same time. Online activities such as bulletin boards, e-mails, e-cards, advertising, etc., are performed based on asynchronous communication by senders and receivers or editors and readers. E-mails and e-cards are representative of asynchronous, web-based communication. Both methods do not require participants to be available at the same time for their communication.

a. E-mail

E-mail was originally designed as a tool for asynchronous communication through the network. It consists of different kinds of online service such as SMS⁵⁶ (Short Message Service), e-cards or greeting cards. E-mail and e-cards are the same sort of application, but have different purposes and uses. We can easily know that e-mail is more like text messages. (see Figure 12⁵⁷) E-mail is a powerful tool for both personal and business use. In business, people often use e-mail programs as a time and task management tool. Sending the same e-mail to multiple receivers is easily accomplished by listing all the addresses together.

⁵⁵ <http://www.webopedia.com/TERM/A/asynchronous.html>

⁵⁶ Digital Mobile Communication, October 20, 2005 <http://en.wikipedia.org/wiki/Short_message_service>

⁵⁷ Hotmail Service, October 27, 2005 <<http://www.hotmail.com>>

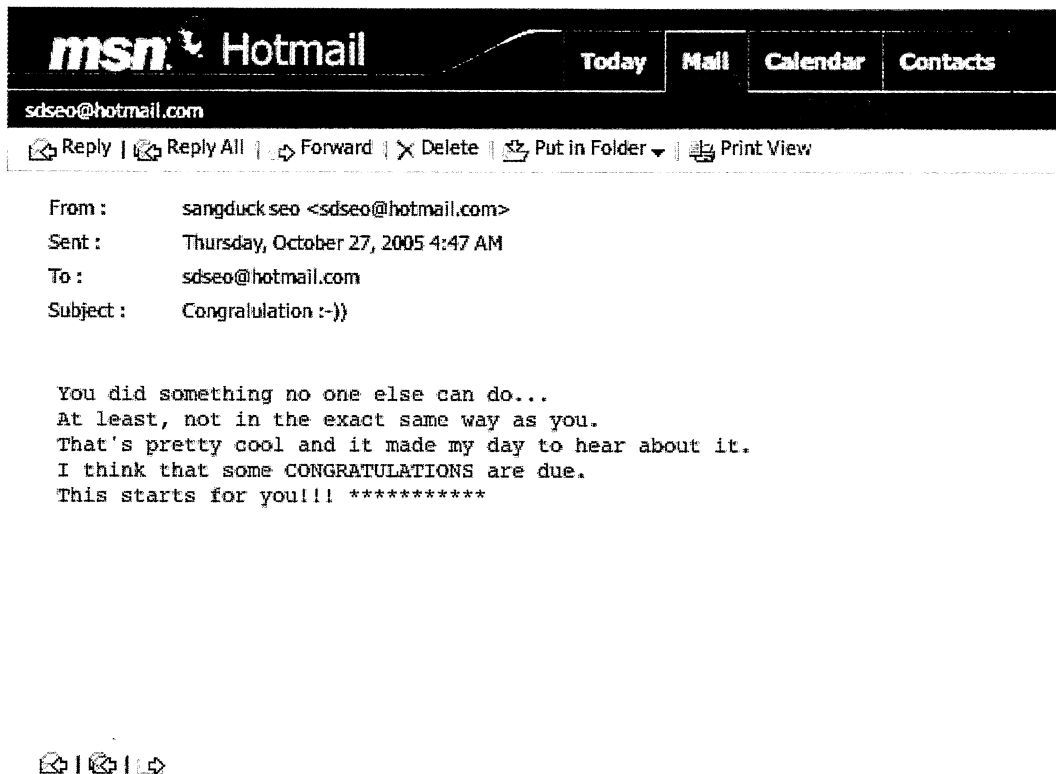


Figure 12. Text Message in E-mail

The expression “You’ve got mail!” no longer necessarily meant a paper letter waiting in a brightly painted mailbox.⁵⁸ If users are logged in, it tells automatically when you get a new message. The Online environment is turned on all the time and is ready for users to be able to access it. Communication doesn’t have to be at a certain time requiring the user to wait to check it. This is because all paper mails such as letters or newspapers are delivered all together once a day and no longer on the Sundays or holidays.

To elaborate more about different message types in e-mails through the online users, the research paper presented by Boneva, Bonka and Kraut, Robert has clearly defined three cases of messages: boilerplate messages, messages for coordination, and messages for

⁵⁸ Brenda Danet, *Cyberplay: Communicating Online*, Berg, NY, 2001, p 51

personal sharing.⁵⁹ Each of these plays a different role in developing and sustaining relationships. Boilerplate messages include jokes, stories, types of greeting cards, pointers to music sites, and other pre-fabricated messages copied by the sender from one source and then forwarded, often to more than one recipient. The second type, coordination messages, is used to set up a joint activity or other occasion where the participants share companionship and other social resources. The messages for personal sharing have personal content that directly supports the relationship. Messages of an expressive nature, provide companionship and social support by allowing communicators to share thoughts and feelings with one another.

The structure of e-mail is the same as the composition of letters people write. It is composed of the address of the sender and receiver in the envelope, and the header and body in the letter. Even though different e-mail applications provide different optional functions, interfaces and features, the key components of the e-mail such as To, Cc, Bcc, Subject, Attachments and Message text area are essential compositional elements.⁶⁰

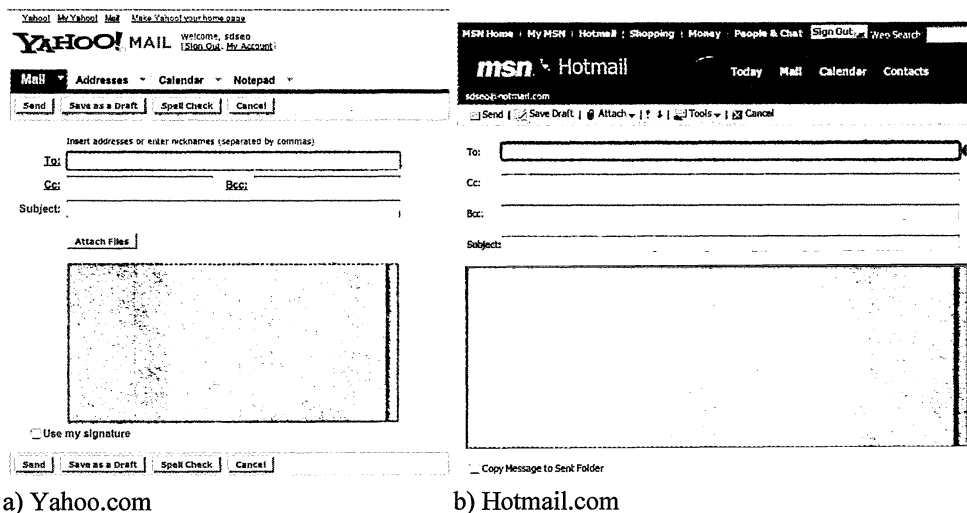


Figure 13. Mail composition environment

⁵⁹ Wellman, Barry and Haythoronthwaite, Caroline, p 393

⁶⁰ David Angell and Brent Heslop, p 15

Figure 13⁶¹ shows two examples of an e-mail message environment. The difference between postal mail and e-mail in the structure of the letter is the way it is being sent even if both have the same message. This is a great response of communicators between receivers and senders. For example, if someone wants to invite people to an informal party and need to inform them right away, there is no doubt that using E-mail would be much faster, easier and more convenient than making a phone call or mailing an invitation. It happens because sometimes someone doesn't answer the phone, and it takes time to receive a response from receivers. But, e-mail is so easy to manage all the messages from others and people trust it as a way to schedule meetings.

b. E-card

E-cards are a part of e-mail activities. It differs from e-mail with more visual elements in its text messages. E-cards contain brilliantly colored graphics, animation and music. Either one sends them as an e-mail attachment, or, more often, the recipient is invited to view the greeting at the Website. As it is called “electronic postcards”, the purpose is a greeting which can be used just to say “hello,” like ordinary postcards. (see Figure 14)⁶²

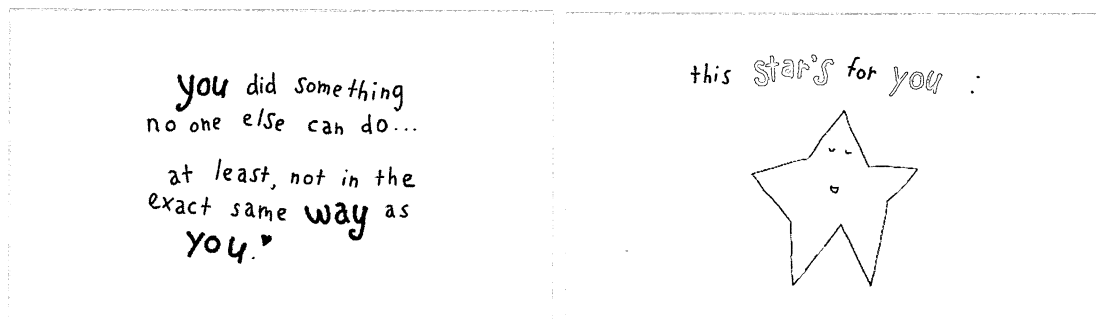


Figure 14. Text Message with Graphic Elements on Flash E-card

⁶¹ a)Yahoo Mail, b)MSN Hotmail, October 27, 2005

⁶² Bluemountain E-card Service, October 30, 2005 <http://www.bluemountain.com/index_ec.pd>

This is great tool to be able to convey more personal like messages such as greetings, thank you, birthday cards, love, etc... E-cards have helped made consumers able to communicate in rich and meaningful ways. Regarding this, in early 1995, “CoolCards”⁶³ were invented by Karen Donoghue in order to allow consumers to create their personal messages as an enriched e-mail communication. Karen Donoghue and her partners in the MIT media lab predicted all multimedia environments, especially, how e-mail was going to explode into importance as the World Wide Web. “Modem speeds were increasing; price of multimedia home PCs were decreasing, and digital imaging was beginning to hit the consumer marketplace.”⁶⁴ According to the limitation of e-mail, Karen Donoghue and her partners especially focused on “Virtual Stationery” with a simple concept that enhances everyday e-mail communication for all types of consumers.⁶⁵

As all this came to become available, many online businesses started to invent more effective, simple, fun, and elegant e-cards. As one example, the “Blue Mountain Card” (<http://www.bluemountain.com>) has provided consumers better service with a simple user interface. There are many different types of e-cards in terms of different purposes of use, and consumers can choose any cards related to their messages. Blue Mountain cards can also be created by a user’s choice based on animated features. In a few clicks, users can simply create their own personal e-card.

Figure 15⁶⁶ is one of the categories: expression.⁶⁷ When users choose one topic under the expression part, it takes users into the next step to have more choices with various

⁶³ Karen Donoghue, CoolCards: Simple Software, Journal of Interaction. Sept/Oct., 1998

⁶⁴ Ibid

⁶⁵ Ibid

⁶⁶ Ibid

animated sample cards. When consumers select one of them, it shows preview features on the preview screen. (see Figure 16⁶⁸)

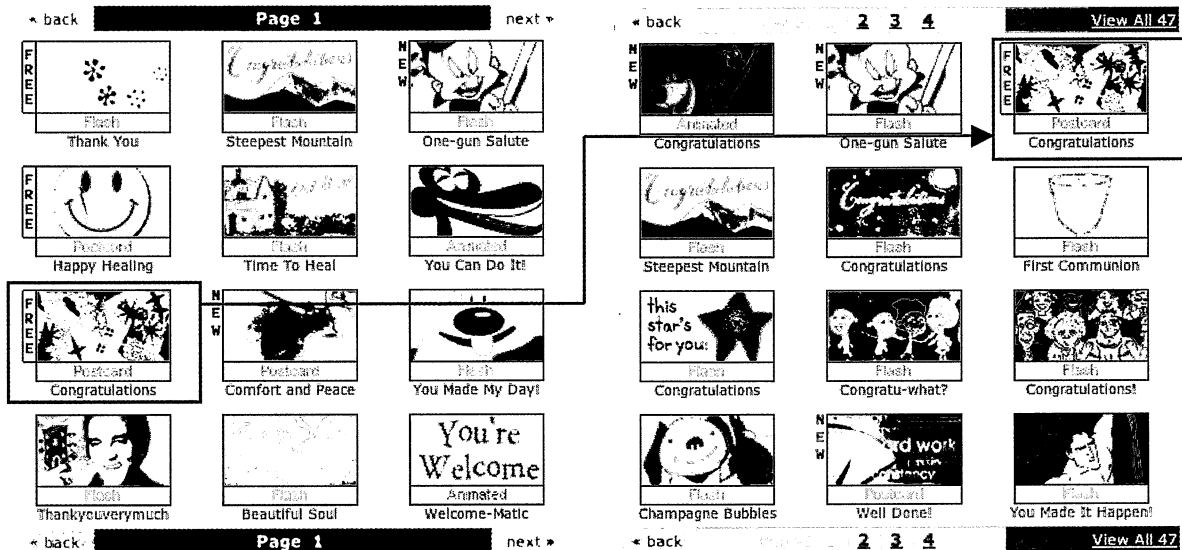


Figure 15. Blue Mountain Card: Click to select the card



Figure 16. Blue Mountain Card: Preview of the final animated card

⁶⁷ <http://www.bluemountain.com/category.pd?path=35049>

⁶⁸ Ibid

Blue Mountain®

Home - E-cards - Congratulations

Personalize Your eCard Just fill in the fields below.

[open address book](#)

Address Book Overview

Hyun
Ins
Jebi
Mom
Nam
anago

[add all](#) [add selected](#)

Sending to multiple users is easy...
PC: Hold [CTRL] + click names to select
MAC: Hold [CMD] + click names to select

NAME: _____ **EMAIL ADDRESS:** _____

NUMBER OF RECIPIENTS: 1 Send this eCard to up to 20 people!
☒ Add address(es) to BlueMountain.com Address Book.

NAME: Sangduck **EMAIL ADDRESS:** sdsed@hotmail.com

MESSAGE:

Don't know what to say, try one of our Suggested Messages.

MEMBERS, YOU CAN NOW CUSTOMIZE YOUR PERSONAL MESSAGE FONT COLOR, SIZE AND STYLE BELOW. MAKE SURE TO PREVIEW YOUR eCARD TO SEE ALL YOUR CHANGES.

FONT: Default **STYLE:** BOLD

ADD A PHOTO TO YOUR MESSAGE!
You can add your own photo to your eCard! [Click here.](#)

SPECIAL OFFERS:
☒ Yes, I'd like to receive Holiday Reminders via email from BlueMountain.com.

Want to preview before sending? [PREVIEW eCARD](#) Ready to

NAME: _____ **EMAIL ADDRESS:** _____

NUMBER OF RECIPIENTS: 1 [Add address](#)

NAME: Sangduck

MESSAGE:

Don't know what to say, try one of our Suggested Messages.

MEMBERS, YOU CAN NOW CUSTOMIZE YOUR PERSONAL MESSAGE COLOR, SIZE AND STYLE BELOW. MAKE SURE TO PREVIEW YOUR eCARD TO SEE ALL YOUR CHANGES.

FONT: Default **STYLE:** Helvetica Times Roman Verdana Courier Comic Sans MS Script Georgia Impact Trebuchet MS

Figure 17. Blue Mountain Card: Creating messages

The final feature of the card they chose includes the design, sound of music and showing a preview of the message with interactive components. This makes consumers respond more quickly as to whether they like to or not. The next step takes users into “Personalize Your eCard”.⁶⁹ This e-card composition environment provides more optional functions for users to create better features of text such as different sizes, colors and fonts

⁶⁹ Ibid

(see Figure 17⁷⁰). In this step, user interface allows the user to create text messages more efficiently. Options for choosing different sizes, fonts and colors of typefaces offer users selections in easy and simple ways. This shows more concern for consumers' experiences and personal expressions. To create more personal greeting cards, users can also insert their own photo and compose simple layouts following different steps.⁷¹ Thus, e-cards allows users to create, personalize, and express their messages more efficiently in a fast way.

c. Advantages and Disadvantages

We use e-mail everyday and there are several reasons why it is the most powerful and dominant communication tool in modern society. David Angel and Brent Heslop defined the benefits in the first chapter of their book, *The Elements of E-mail Style*.⁷² They address these benefits as the answer to the question as to why we can't live without it, and what kind of advantages e-mail has in communication.

- E-mail eliminates phone tag. A good number of telephone calls are unsuccessful because their recipients are busy or away. E-mail eliminates this problem, improves response times, and cuts telephone charges as a bargain. E-mail allows you to digest your messages and put more thought into your responses, which you might not be able to do on the phone.
- E-mail breaks down the distance and time barriers of telephone calls and traditional written communication. It lets you send and read e-mail messages at any time, 24 hours a day, 365 days a year, for better communication across time zones.

⁷⁰ <http://www.bluemountain.com/display.pd?prodnum=3067457&path=35041&bfrom=1>

⁷¹ <http://www.bluemountain.com/display.pd?prodnum=3067457&path=35041&bfrom=1>

⁷² David Angell and Brent Heslop, *The elements of E-mail Style: Communicate Effectively via Electronic Mail*, (New York: Addison-Wesley, 1994) p 2

- E-mail shortens the cycle of written communication. It enables people to circumvent many of the inefficiencies of the office place and the approval process of traditional paper-based communications.
- E-mail empowers individuals by flattening out corporate and sociological hierarchies and allowing for more direct interactive communication.
- E-mail improves productivity in a wide range of interactive activities. It speeds up the decision-making process by providing a forum for replies or clarifications. It also facilitates meeting planning and preparation.
- E-mail creates flexibility in the workday by reducing telephone interruptions. It also allows people to work at home or at a location with a computer.

These definitions of e-mail's benefits are absolutely all in agreement with online users. This is because we understand all situations that we face in everyday life. At this point in the research, questions have developed conceiving different applications, more functions, and efficiency for online users to communicate with one another. It seems there should be something more so we can develop e-mail services with more benefits.

C. An In-depth Study of E-mail

1. Overview

In early 1991, Sproull, L. and Kiesler, S. had already reported that e-mail is speedier than postal mail, more convenient than telephone tag, and more efficient than other means of group coordination.⁷³ It is a fact that e-mail has replaced essential communication methods from other media such as telegrams, telephones, memos or face-to-face contact in our modern society. The report of the UCLA CCP (Center for Communication Policy) reported that e-mail, largely because of these advantages, was becoming a fixture of everyday life, with almost half (42 percent) of Americans now reading e-mail daily.⁷⁴ This data proves the fact how e-mail is a powerful and significant tool of mass communication.

2. E-mail Usages and Purposes

E-mail is a representative tool of online communication. Checking e-mail in the morning or during the day is a part of our life in modern society. Computer technology provides an environment in which people can get e-mail messages anytime or anywhere through the mobile network. The most important consideration of e-mail service is that it is casual, easy and fast.

Using e-mail is a powerful way to contact person-to-person. An e-mail address has become another personal identification in modern society. To demonstrate how it is important and involved into our life intensely, here are some discussions about its uses and purpose. The primary role of e-mail is delivering information for personal or business use.

⁷³ Sproull, L., and Kiesler, S., *Connections: "New ways of working in the networked organization"* (Cambridge, MA: MIT Press)

⁷⁴ UCLA Center for Communication Policy (2000). The UCLA Internet report: "Surveying the digital future."

The functional aspects of e-mail are well established by online users. The purposes of using e-mail, however, are various, and it is becoming something more than just messages. People react to something good or bad by receiving e-mail from several audiences: business ads, personal contact, requested information, etc. This sometimes makes people excited or frustrated. Judith Martin approved of e-mail for neutral or positive business communication, but not for bad news, or for very emotionally charged good news.⁷⁵

Office workers use e-mail as an integral part of their communication at work. Pew & American Life Project surveyed e-mail users at work.⁷⁶ About 62% of all employed Americans have Internet access and virtually all of those, 98%, use e-mail on the job. Figure 18 shows the volume of e-mail sent and received and the time spent writing/reading e-mails.⁷⁷ About 15% of work e-mailers process more than 50 e-mails and almost two thirds of work e-mailers process 20 or fewer e-mails a day. Sixty percent receive no more than 10 e-mails a day, and 63% send no more than five. From the question concerning which is the most effective way to handle these work situations, over 67% responded that they edited or reviewed documents via e-mail, and 63% used it for arranging meetings or appointments. (see Table 3)⁷⁸

⁷⁵ Judith Martin, *Miss Manner's Basic Training: Communication* (Martin 1997)

⁷⁶ E-mail at Work: Few feel overwhelmed and most are pleased with the way e-mail helps them do their job, Pew Internet & American Life Project <<http://www.pewinternet.org>>

⁷⁷ Ibid (p 7)

⁷⁸ Ibid (p 9)

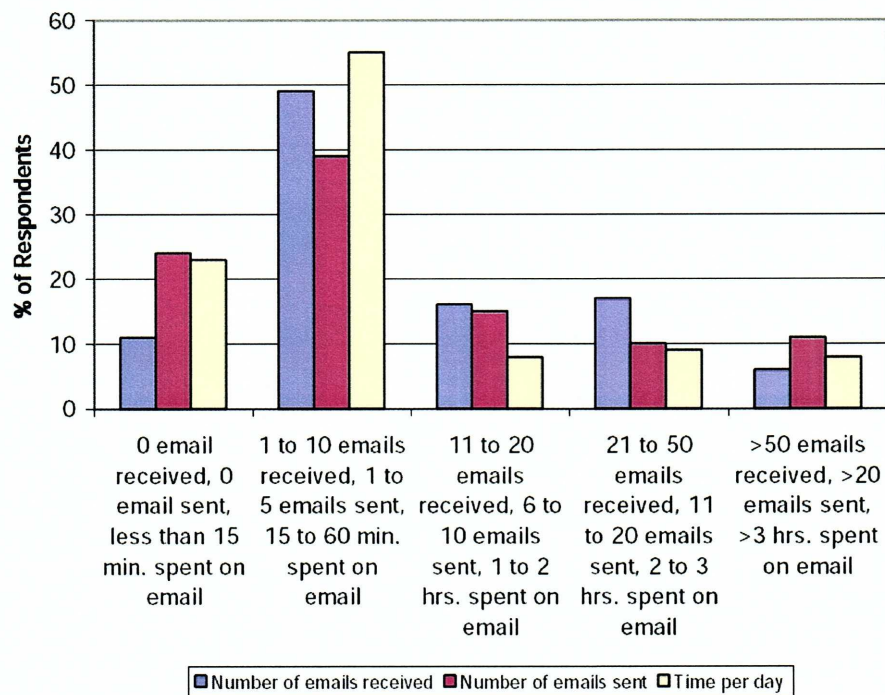


Figure 18. Work E-mailer Profile

Table 2. Work E-mailer Profile

	By e-mail(%)	By phone(%)	In Person(%)
Edit or review documents	67	4	26
Arrange meetings or appointments	63	23	12
Ask questions about work issues	36	17	44
Bring up a problem with my supervisor	6	6	85
Deal with sensitive issues	4	9	85

Among employees under age 30 at work, most are more easy-going about e-mail standards. Nearly double the number of younger workers use their work e-mail to send gossip or discuss personal issues. There are also over 40% who send jokes or chain letters. (see Figure19)⁷⁹ This data proves that e-mail has been a comfortable part of the younger generation's lives for a long time. They are less likely to be professionals, managers, or executives, and more likely to be in sales or work as laborers.

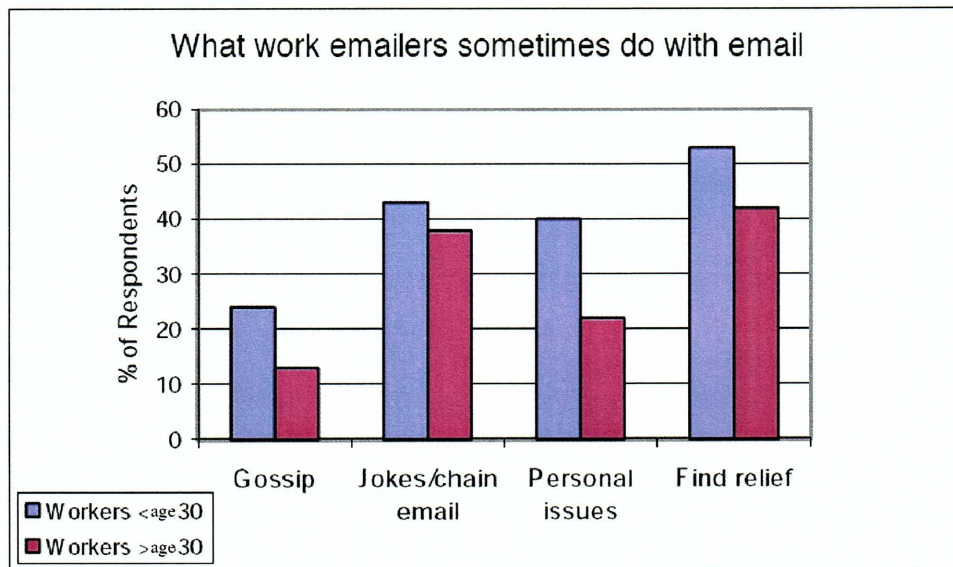


Figure 19. What work e-mailers sometimes do with e-mail

3. Analysis of E-mail Interface

People use different types of e-mail programs that are provided either by online free service or programs they purchase on the market. Many researchers and software companies have been focusing on the interface design of incoming messages to make it user-friendly. E-

⁷⁹ Ibid (p 21)

mail is used instead of phone calls, letters and memos that we are still using. Currently, Eudora is a major e-mail program widely used across college campuses. Most e-mail programs have similar interface and functions such as Eudora and it was chosen for this study. There are two parts of interfaces and functions: the incoming and outgoing messages. This analysis will address these in order to compare and improve the new prototype of an e-mail program for methodology section of this study.

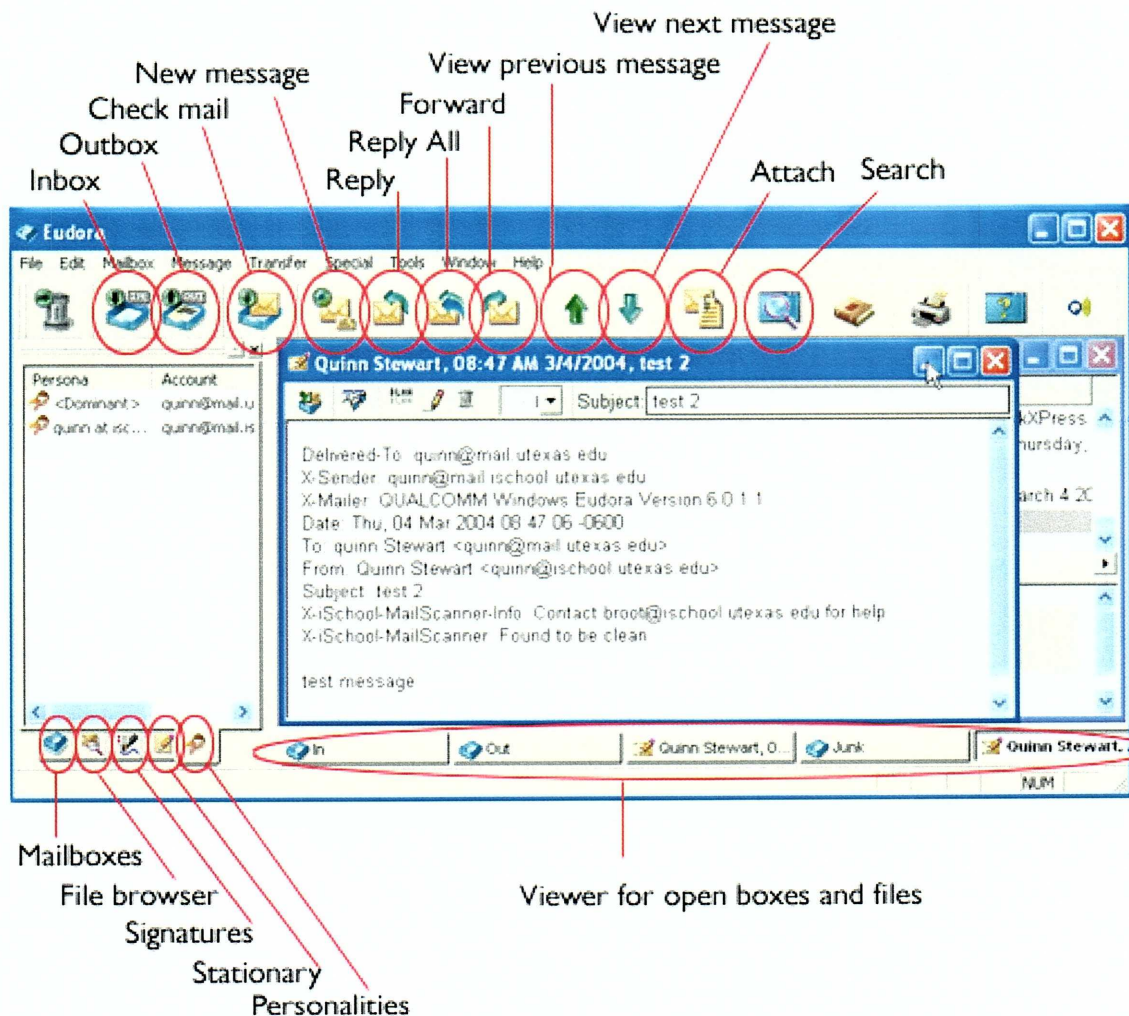


Figure 20. The Interface of Eudora

Figure 20 shows the interface of Eudora 7 for Windows PC.⁸⁰ There are three parts of this interface: Navigation menu on the top, Grouping Map on the left and messages is on the right. The icons are well organized in terms of different functions. However, in the opinion of this researcher, there are a few similar icons grouped on the top. The little symbols between “Reply”, “Reply All” and “Forward” make it difficult to distinguish the different functions. Also, the “Inbox”, “Outbox” and “Check Mail” icons may confuse the users.

a. Incoming Messages

Incoming Messages indicate the messages users receive from other users through the network services. The mail window consists of three panes.(see Figure 21)⁸¹

1. Mailboxes Window: displays e-mail accounts and folders.
2. Message list: displays messages in the selected folder.
3. Message Pane: displays message selected in the message list.

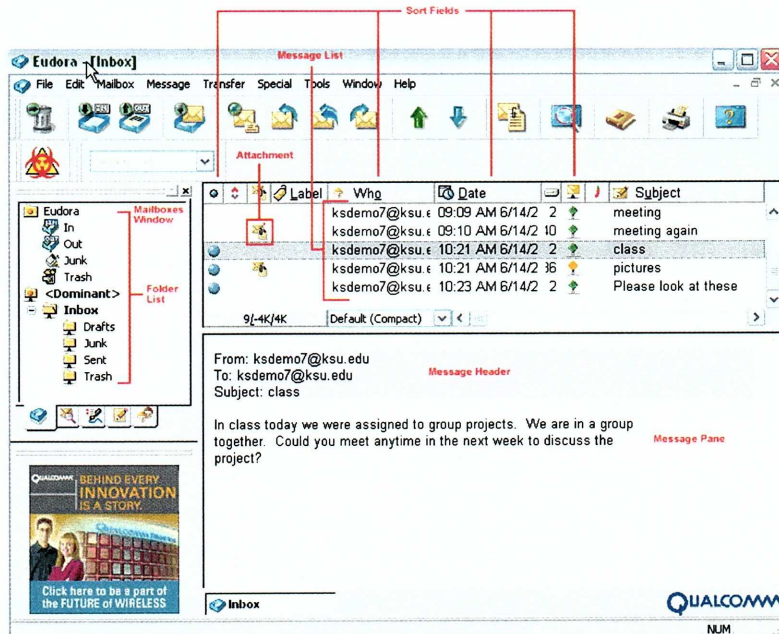


Figure 21. The Interface of Eudora

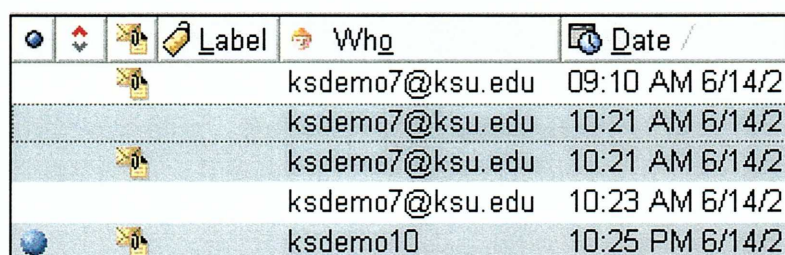
⁸⁰ Eudora Tutorials <www.ischool.utexas.edu/~.../eudora/interface.html>

⁸¹ <<http://www.k-state.edu/InfoTech/e-mail/docs/eudora/eudorawin.html>>

Checking e-mail messages has two methods: checking manually and automatically.

Users can set up the time in special menu options. Otherwise, they can click quickly the icon “Check Mail.” In Eudora’s manual it recommends that fifteen minutes is a good minimum interval because checking mail more often puts an unnecessary load on your incoming mail server. If the text field is empty or is set to 0, mail cannot be automatically checked.⁸²

Through the “Inbox”, users select one or multiple messages, and then they can delete or move messages to other folders. (see Figure 22)



	Label	Who	Date
		ksdemo7@ksu.edu	09:10 AM 6/14/2
		ksdemo7@ksu.edu	10:21 AM 6/14/2
		ksdemo7@ksu.edu	10:21 AM 6/14/2
		ksdemo7@ksu.edu	10:23 AM 6/14/2
		ksdemo10	10:25 PM 6/14/2

Figure 22. Selecting Messages

Users can create more than one folder for personal or group contact folders. It is easy to manage this task and work from a lot of messages you receive frequently.

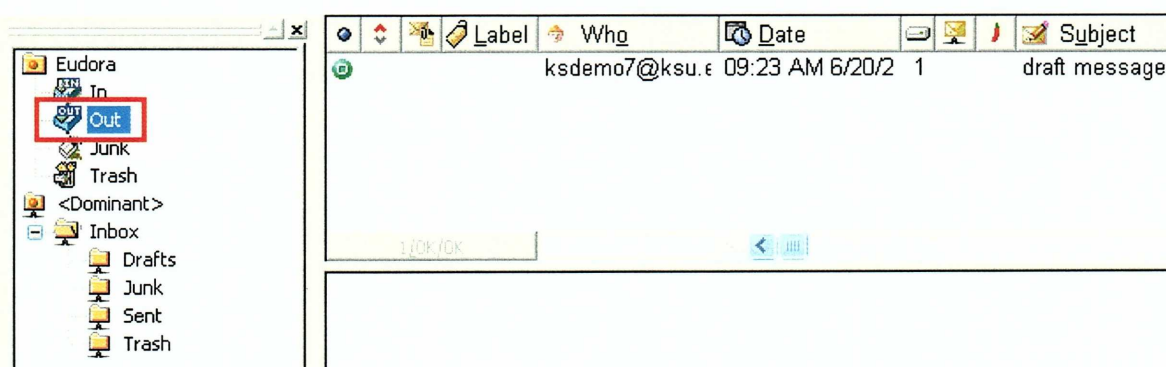


Figure 23. Mailboxes

⁸² Eudora User Guide < <http://www.eudora.com/e-mail/docs/index.html> >

b. Outgoing Messages

Outgoing Messages consists of two different types. One is the “reply” from received messages through the inbox, the other is composing new messages. Once users can click the “New message” icon, the new interface is divided with header and body. Users can send their messages to one or multiple recipients by adding an e-mail address. Figure 24 shows the interface of Eudora 7 for composing messages.⁸³ All e-mail has only one way to create messages based on text writing.

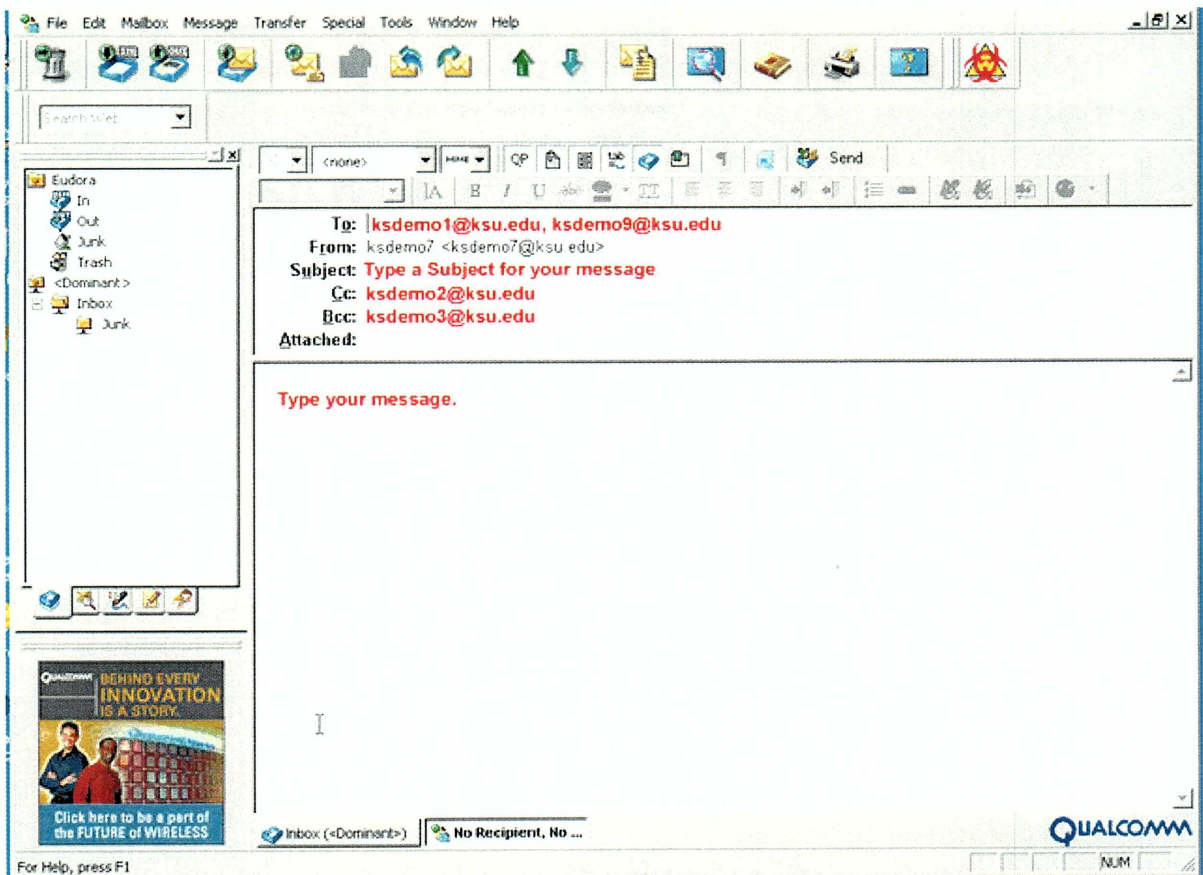


Figure 24. Composing Messages

⁸³ Eudora User Guide <<http://www.eudora.com/e-mail/docs/index.html>>

c. Problems

Composition format contains two different categories: informal conversational messages and business letters related to a company's advertising, educational contacts, etc.. Especially, business letters are distinctive from personal letters because of identifying their business such as corporate identity or business type of envelopes. However, different messages or information on e-mail are not organized by topic. From the research about "hypermail by David R. Woolley,"⁸⁴ this researcher recognizes that there is nothing significantly different that appears between the different messages in an e-mail box. Wolley describes that threading is difficult or impossible, because not all mailers supply enough information to associate a reply with another specific message. Even when they do, most mail reading programs do not display messages as threaded topics.' This is not only the weakness part of display in design aspects, but also a lack of an e-mail service environment at the moment.

Pew Internet & American Life Project reported that 77% of business e-mailers said e-mail helps them keep up with events at work, but 85% of participants prefer to have conversations when they are dealing with workplace problems and other sensitive issue.⁸⁵ This proves that e-mail written by text cannot convey all emotional expression to make receivers understand it. Thus, even though we have different and various purposes of using e-mail, the display messages in the mailbox or window look very much the same with text bases. This might be a problem because using only text doesn't have enough "sense" in order to show as a visual look. This study will illustrate how we can convey messages distinctively

⁸⁴ Woolley, David R., Conferencing on the Web, <<http://www.thinkofit.com/webconf/wcunleash.htm>>, 2005

⁸⁵ E-mail at Work: Few feel overwhelmed and most are pleased with the way e-mail helps them do their job, Pew Internet & American Life Project <<http://www.pewinternet.org>>

in terms of different purposes and different types. Then, users would be able to create their own types of messages based on different purposes of e-mail use.

4. Current Research

The amount of e-mail has greatly increased over the past ten years, but user interfaces to support e-mail have changed very little compared to other programs. According to e-mail overloading, many people have focused on research and experiments to make e-mail user-friendly. Most research was related to business users. Some office workers receive over 100 e-mail messages each day. This is a ridiculous number of messages to read, respond to and organize all the incoming messages.

a. Problems with Incoming Messages

Research done by Neustaedter, Brush, and Smith at Microsoft Research identified serious problems with e-mails. Based on their research they concluded ‘The problem arises because existing e-mail user interfaces do not provide users with an effective means for performing e-mail triage. Existing interfaces usually provide only the most basic information about new e-mail, such as who it is from, when it was received, and the subject line. When receiving large volumes of e-mail, this information does little to help users decide which e-mails are the most important or which should be handled first.’⁸⁶ Another problem workers had with incoming messages was when the employees were away from their desks (on vacation or for other work) and the number of e-mails continued to increase and become less manageable.

⁸⁶ Neustaedter, Carman., Bernheim Brush, A.J. and Smith, Mare A. ‘*Beyond “From” and “Received”*’: *Exploring the Dynamics of E-mail Triage*.’ CHI 2005:Late Breaking Results: Short Papers, April 2-7, 2005: Portland, Oregon. (pp 1977- 1980)

To solve the problem with organizing e-mail, they took a survey on the types of incoming messages from different contacts. They created six different questions to analyze it. One question asked was what e-mails do people try to handle first? They discovered that workers would first handle junk or not important e-mail in order to delete or file it. By eliminating the lesser important e-mail, they found the employees could more quickly identify the important e-mails. Also, the selection of the important e-mails depended on the workers schedule for the day, current project, and other factors.

Other research focused on the differences between the e-mail receivers, labeling them as “cleaners and keepers.”⁸⁷ There were major differences in the ways that the workers in these two groups dealt with their incoming e-mails, identified in the chart below:

Table 3. Description of Differences Between Cluster Members

E-mail Habit Variables	The Cleaners (Cluster 1)	The Keepers (Cluster 2)
When e-mail is read	Read e-mail at specific times	Read e-mail all the time
E-mail interrupts other tasks	E-mail does NOT interrupt other task	E-mail interrupts other tasks
Use search in e-mail	Do NOT search in e-mail	Search in e-mail
Keeps events in e-mail	Do NOT keep events	Keep events
Keeps to-do's in e-mail	Do NOT keep to-do's	Keep to-do's
E-mails self-reminders	Send self-reminding e-mail messages	Do NOT send self-reminding e-mail messages.

⁸⁷ Gwizdka, Jacek 'E-mail Task Management Styles: The Cleaners and the Keepers' CHI 2004:Late Breaking Results: Short Papers, April 24-29, 2004: Vienna, Austria. (pp 1235-1238)

Table 4 shows a descriptive interpretation of the differences between the two clusters.⁸⁸ People in cluster 1 transfer future task/event information from e-mail programs. They seem to have more control over their e-mail behavior, by not letting incoming messages interrupt other activities and by setting specific times to read messages. They tend not to use e-mail to handle messages related to tasks, to-do's or events. These people are *the cleaners*. In contrast, people in cluster 2 treat e-mail as a habitat and keep future task/event in e-mail programs. They let incoming e-mails interrupt other activities and read messages all the time. They also tend to use e-mail to keep and handle messages related to tasks, to-do's or future events. These people are *the keepers*.

There is additional research that focuses on controlling the inbox. Balter and Sidner interviewed people and made the following observations:⁸⁹

- All users but one scanned new messages several times in order to read the most important messages and at the same time delete the least interesting. However, few users succeeded. Most took care of the easy ones first, and the second and third scan revealed that they were not very successful even in doing this.
- Messages related to events in the calendar for the day were judged important, regardless of arrival date.
- Users changed (already read) opened messages to unread as a reminder that they were unfinished tasks.
- In general, the fewer recipients there were of a message, the more important the user considered it.
- Replies were important as they often contained a solution to a problem posted by the recipient.
- More than half of the subjects did not read all of their messages.

⁸⁸ Ibid

⁸⁹ Balter, Olle & Sidner, Candace L. 'Bifrost Inbox Organizer: Giving users control over the box' NordiCHI, October 19-23, 2002 (pp 111- 118)

- Some subjects feared that they would miss important messages during their scanning of the new messages.
- Subjects who mentioned filtering feared that filtering would move messages out of sight.
- For most users, carbon copies were judged as less interesting than other messages, but not always.
- Four of the subjects did not delete any messages with the exception of failed delivery reports.

Balter and Sidner created a prototype named the Bifrost Inbox Organizer which provides users with categorized e-mails making it easier for them to quickly focus on the e-mails most relevant to a particular work task.

Candace Sidner also worked with Steve Whittaker to demonstrate that e-mail overload creates problems for personal information management.⁹⁰ They stated that e-mail applications were designed originally for asynchronous communication, but they have evolved to being used for multiple purposes. Employees told them that e-mail was a great communication tool allowing them to work with others across time and distance.

However, they experienced major difficulties reading and replying to e-mail in a timely fashion and had backlogs of unanswered e-mails which led to lost information and reduced responsiveness. Today, according to Sidner, there are three main e-mail functions: 1) task management, 2) personal archiving and 3) asynchronous communications. In particular, asynchronous communication is concerned with interaction in a permanent medium across space and time. Research has characterized face-to-face workplace communications as

⁹⁰ Whittaker, Steve & Sidner, Candace. *'E-mail overload: exploring personal information management of e-mail.'* CHI 96 April 13-18, 1996. (pp 276-283)

consisting of repeated brief communications.⁹¹

Sidner and Wittaker found that e-mails which required more time fell into four categories: 1) "To do e-mails," 2) "To read e-mails," 3) "Messages of indeterminate status," and 4) "Ongoing correspondence." The "to do e-mails" required the user to do some sort of action which might take time to accomplish. These were usually kept in the inbox as a reminder of an unfinished task. The "to read e-mails" were often long documents, informational, and didn't require a reply. "Messages of indeterminate status" were ones where the receiver was unsure of the importance of the incoming message and delayed dealing with it. Later, they might receive many subsequent e-mails stating the importance of the earlier e-mail. Or the e-mail might not require any further action and remain unanswered in the receiver's inbox. The fourth category, "Ongoing correspondence" will remain in the receiver's inbox because it requires further investigation from another person, or a time-consuming reply from the receiver, or complex interactions involving multiple replies over a period of time.

John E. Bucher, director of computing services at the University of South Dakota, suggested some effective guidelines for serving customers with e-mail. He created five necessary guidelines as follows:⁹²

1. Always consider e-mail that you send to be part of the permanent and public record. Slow down, think, read, re-edit, and then send your e-mail.
2. Use proper and thorough identification of the sender and the sender's affiliation. Use a proper salutation.

⁹¹ Whittaker, S., Frohlich, & Daly-Jones, O. Informal workplace communication: What is it like and how might we support it? CHI 94, *Human Factors in Computing Systems*, ACM Press, New York, 1994 (pp 130-137)

⁹² Bucher, John E. 'Some Suggested Guidelines for Serving Customers with Electronic Mail.' SIGUCCS Newsletter, Spring 1993. (pp 3-5)

3. In most cases, e-mail messages should be limited to a single page, single topic. Shorter messages will be read more thoroughly and have more impact. Also consider the appearance of the message.
4. Avoid emotional messages when using e-mail to communicate with customers. Emotions are not always interpreted properly.
5. Use common courtesy at all times. E-mail messages should be kept business-like and courteous at all times.

Bucher believe that human factors (such as human contact, emotions, etc. that are important in every day face-to-face situations, also apply to writing e-mails. By following his guidelines, it can lead to better customer service via e-mail. He stated, 'We should periodically take the time to review our practices using this medium and make conscious efforts to improve them. Computing services personnel need to review, monitor, and improve their electronic communication skills so as to improve their overall customer service techniques.'⁹³

b. New Prototypes by Other Researchers

Researchers and companies have created new e-mail prototypes which address some of the problems addressed earlier in this research. They focused on high-volume e-mail users with inadequate folders for categorizing e-mails. Many users kept all of their e-mail in one large folder. Also, the researchers found that e-mail today consist of letters, invitations, receipts, transactions, discussions, conversations, tasks, newsletters, etc.⁹⁴

⁹³ Ibid.

⁹⁴ Ducheneaut, N. & V. Bellotti. E-mail as Habitat. *Interactions*, 8(5), Sept.-Oct. 2001, ACM (pp 30-38)

A team of researchers at the IBM T. J. Watson Research Center considered certain features when creating their new prototypes.⁹⁵ The goal of their second prototype design was to create an integrated e-mail experience reflecting feedback from their tests and to provide a platform for further innovation (see Figure 25).

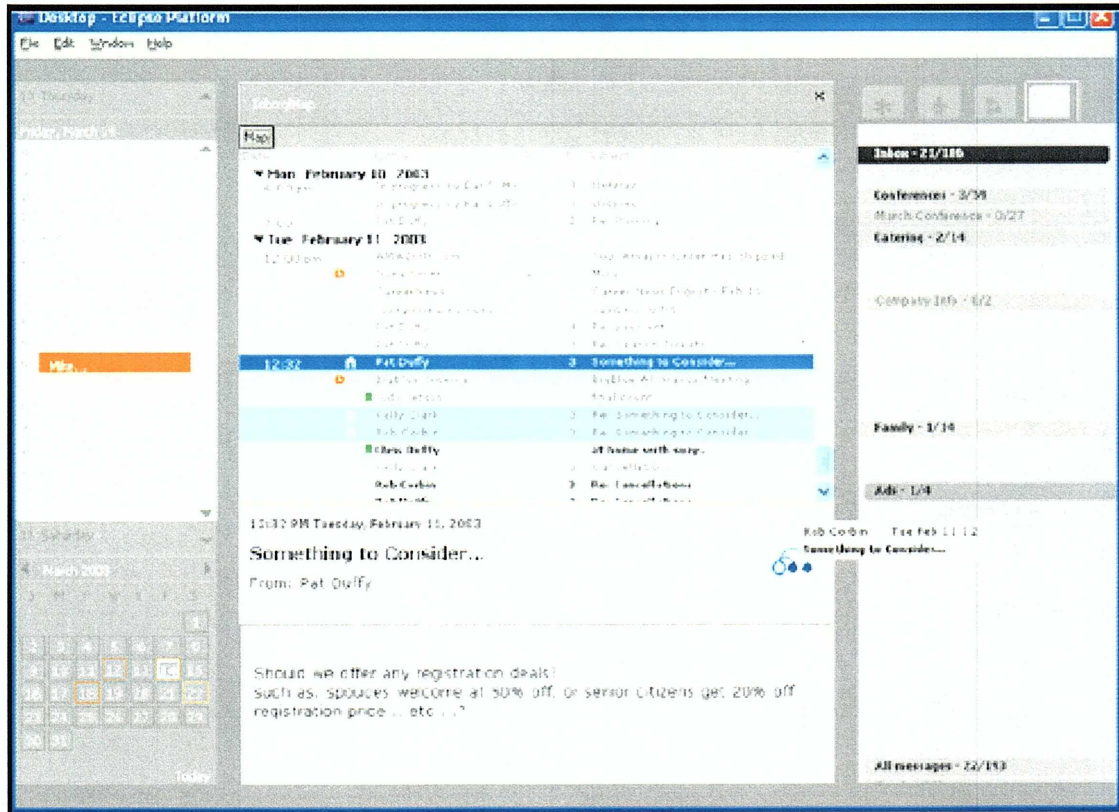


Figure 25. The Second Re-mail Prototype

The features of the second prototype were as follows:

1. Thread Map: They designed a scheme, called “thread arcs” that showed message chronology along with the reply relationship of a threaded e-mail conversation.⁹⁶

⁹⁵ Gruen, Daniel., Rohall, Steven L., Minassian, Suzanne., Kerr, Bernard., Moody, Paul., Stachel, Bob., Wattenberg, Martin & Wilcox, Eric: Lessons from the Re-mail Prototypes, CSCW'04, November 6-10, 2004, Cicago, IL (pp. 152-161)

⁹⁶ Kerr, B. Thread Arcs: An E-mail thread Visualization. In *Proceeding of IEEE InforVis*, Seattle, WA, October 19-21, 2003

2. Correspondent Map: It helps users view messages from people they corresponded with most often. It groups messages within a collection by sender, domain, and number of messages sent (See Figure 26).



Figure 26. The Correspondent Map

3. “In-Sight” and “Out-of-Sight” Collection: Folders called “Collection” combine the features of standard folders with dynamic, rule-based views. The users can manually move messages to in sight (Inbox) or out of sight folders.
4. Multiple Sources: The users can access documents from additional sources and treat those documents like e-mail messages. IBM Lotus Quickplaces was one such source.
5. Calendar: A calendar appears on the same page as e-mail messages. It plays an important role in the e-mail experience, and messages can be dragged and dropped into the correct month, date and time.

After testing “the second prototype”, many of the features were developed further and new features such as date extraction, more choices for external sources, and several search

capabilities were added. Their newest prototype “Figure 27” includes a range of visualizations, advanced text analysis, and attention management features.

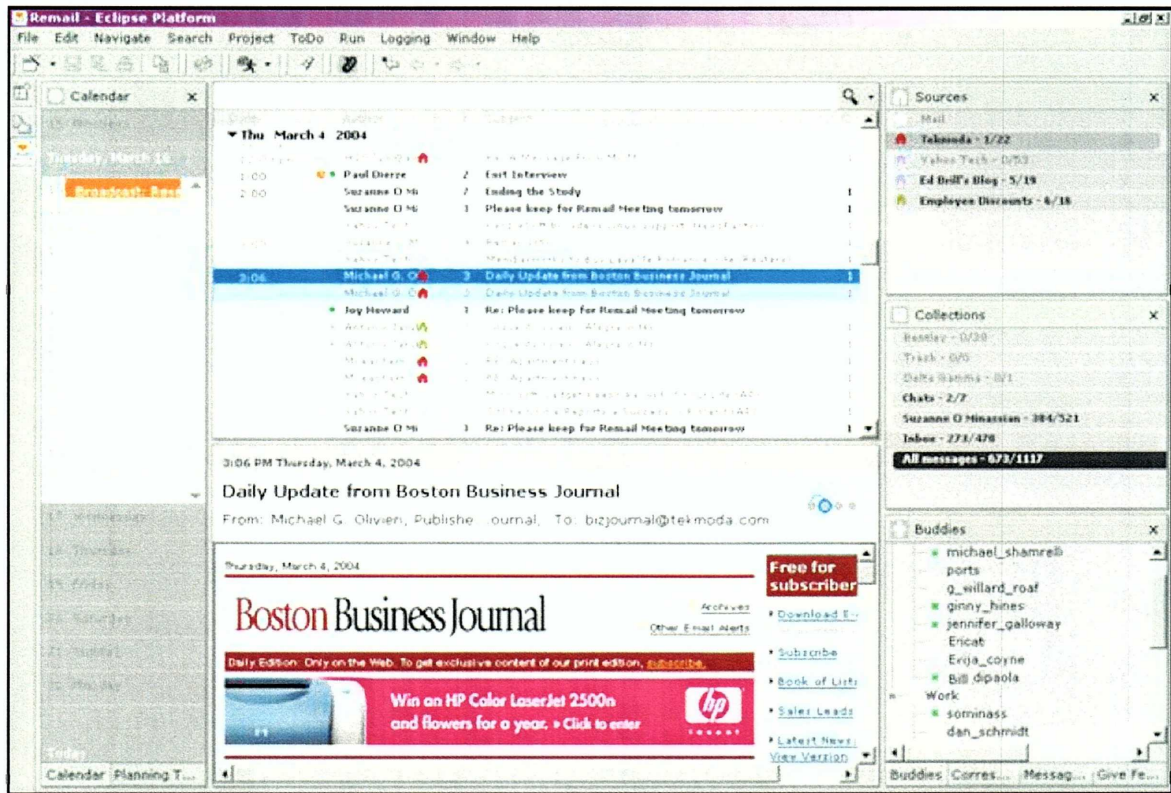


Figure 27. The Current Re-mail Prototype

The main goal of the IBM T. J. Research Center prototypes was to reduce the problems workers had when managing their e-mail. In particular, keeping track of information, feeling pressure to respond quickly, and feeling overwhelmed by the amount of e-mails. The researchers addressed these problems through devices such as threads and collections. Many other features are added but there were different opinions as to how valuable they were depending on users' job needs and work settings.

Another team of researchers from IBM Research Center also created a new prototype which focused on the three key problems of e-mail.⁹⁷ They were 1) lack of context, 2) co-opting of e-mail and 3) keeping track of too many things. Their solutions were based on three constructs: 1) showing message context, 2) marking e-mail, and 3) selective display. The researchers decided from the onset that the solutions they made would have to provide people with multiple, integrated ways to organize and act on their e-mail. A second goal was to keep the design specifications within the limits of the developer's technology choices. The design had to be possible for a small team of developers to build quickly.

They created the Extreme Blue Prototype (see Figure 28). This prototype was their first attempt at incorporating a handful of design concepts into a system that worked with people's existing e-mail.

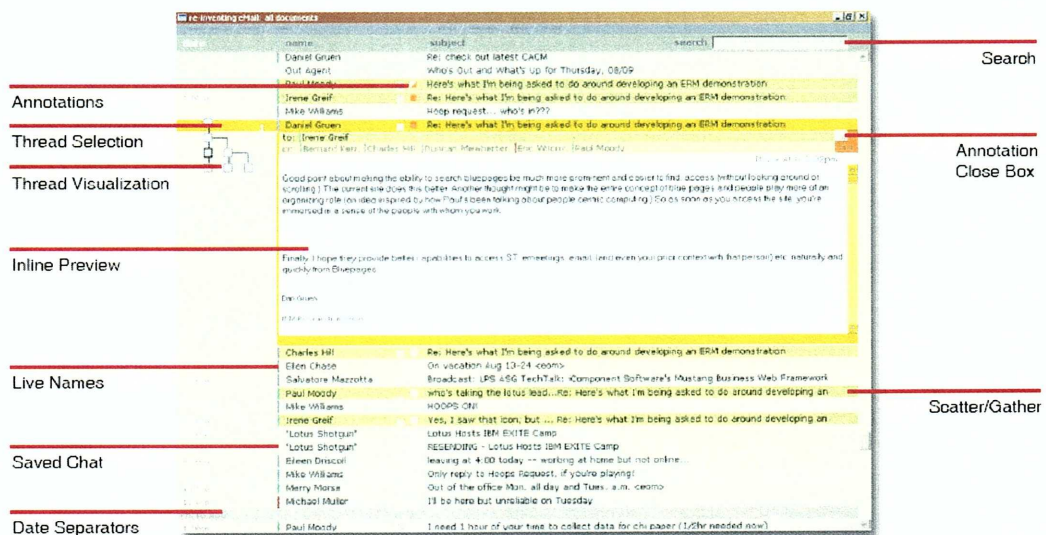


Figure 28. Extreme Blue Prototype (summer 2001)

⁹⁷ Bernard Kerr & Eric M. Wilcox, Designing Re-mail: Reinventing the E-mail Client through Innovation and Integration, CHI 2004, April 24–29, 2004, ACM, Vienna, Austria. (pp. 837-852)

Since they were working with a small team and limited time, they were unable to implement all their ideas, so they documented their concepts in an interactive demo called “Dre-mail” which was built with Macromedia Director. (see Figure 29)

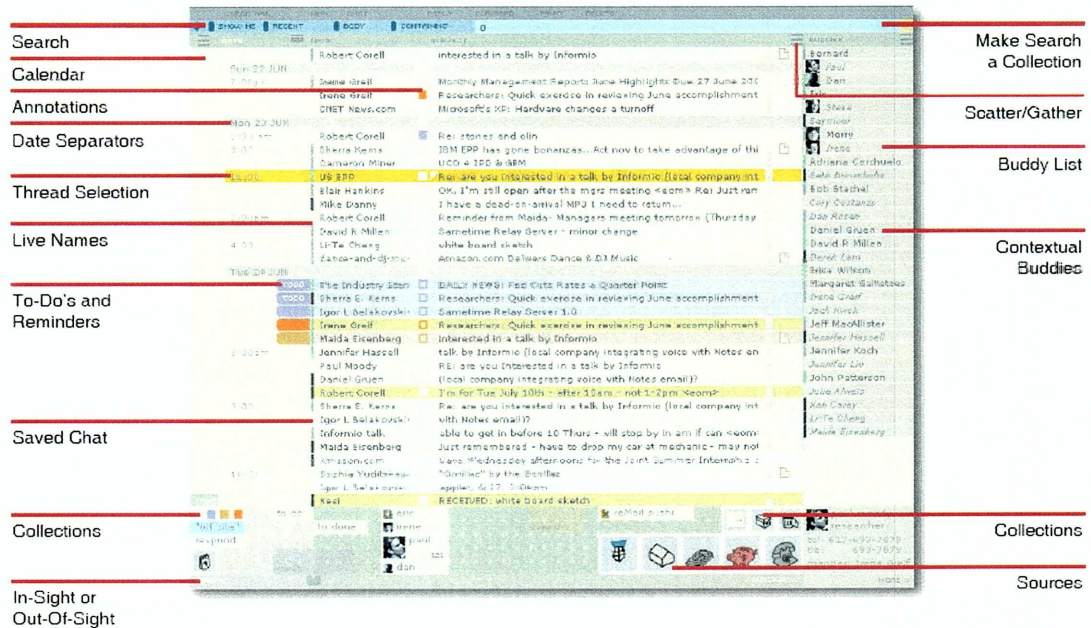


Figure 29. Dre-mail Demo (October 2001)

The primary challenge was to conceive of an integrated e-mail client which they could test on people with their e-mail over a long period of time. A team of three designers divided the high-level design task with one designer leading the interface design, another the documentation effort and a third designer had control over communicating the design to external audiences. Among their solutions were many innovative ideas such as the interface consisting of a Calendar, two major tab areas (see figure 30).



Figure 30. Main Tabs Elements in Re-mail

The first tab area was tabs for list of messages and the preview. There is always a tab for the Inbox List and other List Tabs can be opened to show all of the messages in a collection, thread, or search. The second tab area consists of Favorites, Buddies, Threads, Collections, and Sources Tabs.

Another feature that was added to the prototype was chatting service. For example, any name field in the Inbox List or Preview shows that person's on-line status (e.g. "active", "away from desk", "do not disturb"). By clicking on the name of a person the user can start chatting or drag the name to their Buddy List for future use. Also, the user can save chat as new messages in their Inbox and organize and mark them like any other messages. This is great idea to interact between users as informal communication and an example combining both synchronous and asynchronous communication in one interface method.

The researchers also developed an annotation feature which is like a Post-It note (see figure 31). It allows the user to mark a message with a small colored icon of their choice which can also have associated text. The annotation can be used in many different ways. For example, a red annotation could indicate it's urgent, continuing e-mail that needs to be answered.

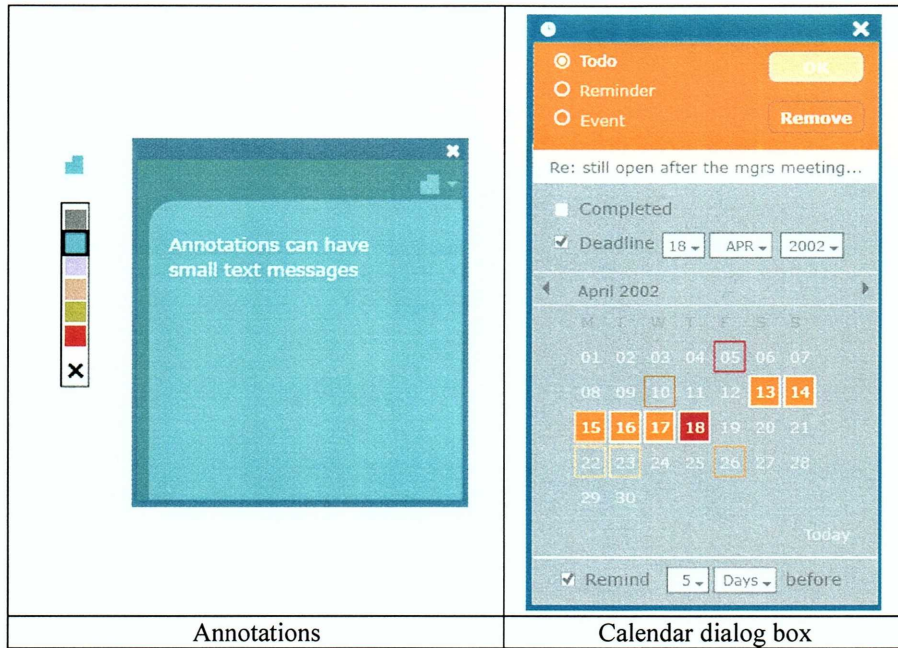


Figure 31. Annotations & Calendar

A final feature included in the prototype was a calendar (see Figure 31) which had three markings to e-mail: 1) To-Do, 2) Reminder, and 3) Appointment. The markings can be applied by dragging a message onto a day on the Calendar Tab.

A dialog box fills in the day's information and gives additional options. Once an item on the "To-Do" list is done, it is marked as "Completed To-Do" and archived with other complete tasks. An "Appointment" is similar to a Reminder, except that it has a time associated with the day, for example, "meeting on the 2nd from 1:00-2:00." Appointments appear on the Calendar Tab for that day. The calendar is a thin strip along the left side of the screen.

5. Conclusion

All different examples of online communication have shown both strength and weakness with function and interface. Table 4 shows summary of positives and negatives for all online communication programs which were researched for this study.

Table 4. Positives and negatives for all examples

Program	Positive	Negative
Yahoo & MSN	<ul style="list-style-type: none"> - Useful functions: E-mail, IM Chat, Game, Mobile Connection and Music - Interactive Menu Navigations: Icon Design in IM Chat - Synchronous Communication (Video & Voice Chat) - Emotional Expression (Emoticon) 	<ul style="list-style-type: none"> - Managing Folders - No Search option - No significant identification of messages in the mailbox - Only text messages
Eudora	<ul style="list-style-type: none"> - Good structure layout - E-mail notification - Icon Menu navigation bar - Preview - Provide Stationary 	<ul style="list-style-type: none"> - Only text messages - Confused Menu Icons - No significant identification of messages in the mailbox
Blue Mountain e-card	<ul style="list-style-type: none"> - Provide animated text and image - Emotional expression - Multiple receivers at once 	<ul style="list-style-type: none"> - Too many categories to choose from & Missing categories - Confusing operation for creating your own card - Too much text instruction instead of icon menu
ReMail Prototype	<ul style="list-style-type: none"> - Scheduler (Calendar) - Thread Map & Correspondent Map - Multiple sources (Access documents) 	<ul style="list-style-type: none"> - Keeping track of too many things in the window display - Lack of context
Dreamail	<ul style="list-style-type: none"> - Simple layout of functional structure - Interface (Menu Tap with simple icon design) - Annotations (Short Memo) - Useful calendar dialog box (To-Do, Reminder, and appointment) 	<ul style="list-style-type: none"> - Menu Tab (Vertical menu text) - Too many information at once in the mail box - Weak of distinctive graphic between menu and text information.

CHAPTER 3. DEVELOPMENT OF APPLICATION

A. Proposal

The purpose of this study is to propose a new environment for an e-mail program for enhanced and interactive online communication in the future. The main consideration for developing a prototype design was to create useful functions and an interactive interface design. In this chapter, problem statements and questions from early research in the literature review will be discussed to suggest improvement of the e-mail environment. According to a survey from Pew Internet and American Life in a literature review chapter, it was proven that the number of e-mail users has been increasing greatly every year. Many research papers and examples of the current online communication's tools have shown how important and essential it is to make our communication easier and more convenient.

This chapter will describe the analysis of the problem with current e-mail applications and will show the developed function and design as a proposal for a new program. This chapter also provides a prototype design based on interactive navigations between “incoming” and “outgoing messages.” The prototype design of this study provides a new communication method for online users to be able to conduct not only visual communication, but also more interactive usability.

1. Analysis of Problem Statement

The following are all problem statements from analysis of contemporary e-mail programs. These problematic statements will be narrowed down to come up with several

questions or suggestion in order to develop an e-mail application. The major problem to solve is to reduce the large number of e-mail messages users receive everyday. It is obvious that every message is not necessary to send out through the text basis. It would be better if the user can define different types of messages based on their purpose. The following are two different research areas from “Dre-mail Demo” and “Re-mail”: the e-mail program needs to be considered to improve its function and design.

Table 5. Analysis of Functions

	Usefulness and Convenience
Incoming	Directory (Contact List)
	Periodical Order
	Directory (Folders)
	To-do's (Reminder)
	Preview
Outgoing	Text message
	Attachment
	Business Letter
	Contact List (Address Book)
Others	Search
	Schedule
	Distinctive Mail
	IM Service

Table 6 shows all categories analyzed the problems and weakness parts from “Dre-mail Demo” and “Re-mail.” The main consideration in this table was how useful and convenient it is to use all the menus and functions. All categories reveal the fact of how important e-mail application is for online users. The overall analysis of these functions was

not good enough for both usefulness and convenience. Thus, functional structure and information architecture will need to be considered to solve these problems.

Table 6. Analysis of Design

	Consistency and Hierarchy
Layout	Menu
	Display
	Function
	Grid System
	Using Design Elements
Interface Design	Icon
	Typography
	Color
	Navigation Method

Through research, it was discovered that the main problem was that most e-mail programs haven't shown any consistent layout and there is weakness in their interface designs. This is because the purpose of using e-mail has been confined to people checking and creating only text messages. Especially, the main problem of using e-mail was to get a huge number of messages everyday and that could be a major problem to manage all the incoming messages when users are unable to check their e-mails for a couple of days.

In addition, this researcher believes there were also other issues where e-mail programs were not adequate enough in terms of their visual elements: icons, color and typography. These are important elements in design to make it look better; moreover, it helps ease of use it easily when there are many different functions. This factor is the essential task for all of the solutions to the interface design for this study.

2. Other Recommendations

To make an enhanced communication tool with an e-mail program, this tool needs to be a more interactive functional network for online users. Based on the benefits of synchronous communication in this study, adding IM (Instant Messengers) would help better communication for online users. This function is used by many online users for quick notes or a long discussion instead of using the phone. This is a great tool to use e-mail programs together with IM for people at work and school, even at home. Using IM means that e-mail is not text messages based on synchronous communication. This fact gives us a question; what if people can use communication tools both asynchronously and synchronously? And then, sending a short message such as a “Post-it” which would be possible to use if a receiver is away from his/her computer or offline.

Another suggestion to this study is to enable users to create “E-cards” by using animated text. This is a simple method to send different type of messages in order to express a sender’s emotions or feelings in their messages. The problem with current e-card service is that it is time consuming to choose the card they prefer to send. Simple and easy functions and design will make users satisfied to create their own messages to delivery to others.

B. Prototype Design

Based on research and analysis of current e-mail programs, the main consideration for the prototype would be to enhance interactive functions together with an improved interface design. This prototype will include useful and essential functions from the research in this study. There are two parts to this e-mail prototype: incoming and outgoing. Each part allows easy interaction with users in a convenient way. Synchronous communication as IM (Instant Messaging) will show its benefits and powerful functions in conversation by using asynchronous communication methods in different situations.

1. Interface Design

“Keep it simple and pretty”⁹⁸ is consideration for usability of interface design. “The GNOME Usability Project” by Calum Benson, Adam Elman, Seth Nickell, colin z robertson introduced how important it is to present information and interface elements in an aesthetically pleasing manner. A well-designed application will make it easy for the user to understand the information that is being presented, and show them clearly how they can interact with that information.

a. Navigation Map

In this chapter, a map of e-mail interaction reveals how this e-mail program interacts with entire functions. Figure 32 shows its functions and forms between the incoming and outgoing parts of the e-mail application. It shows four different functions of e-mail: e-mail, chat, post-its, and to-do's.

⁹⁸ www.developer.gnome.org/projects/gup/hig/1.0/index.html

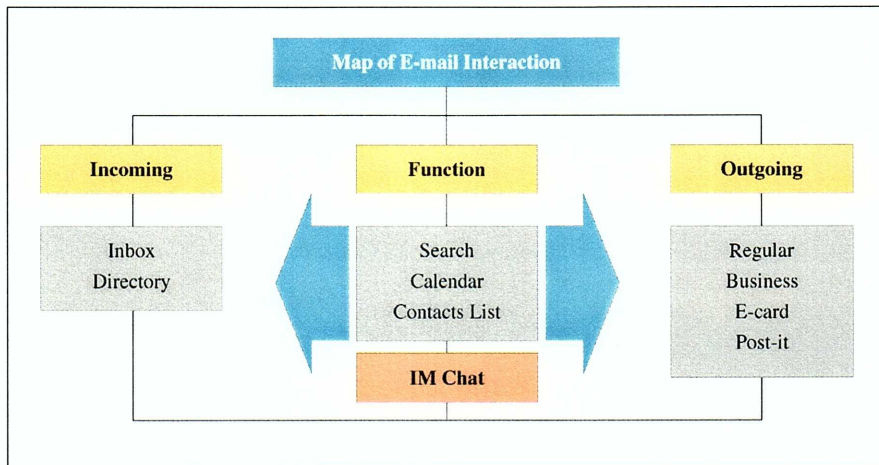


Figure 32. Map of E-mail Interaction

In terms of suggestions for the synchronous communication method, IM (Instant Messaging) the chat program is involved in this application. Between the incoming and outgoing functions, there are more useful functions to be better able to interact with sent and received messages: Search, calendar and contact lists are common functions to be able to read, write and manage messages faster and easier. To provide users more options and functions to be able to create different type of messages, there are four different types of composition environments provided; e-mail, business letter, post-it and e-card.

b. Design Layout

The purpose of the design layout was to create a consistent and simple interface making it easy to navigate and interact. Figure 33 shows an entire display of the main navigation page when users log in to their account in an e-mail program. A color and grid system was used to give it distinctive features in terms of different sorts of functions and hierarchical structure in interface design.

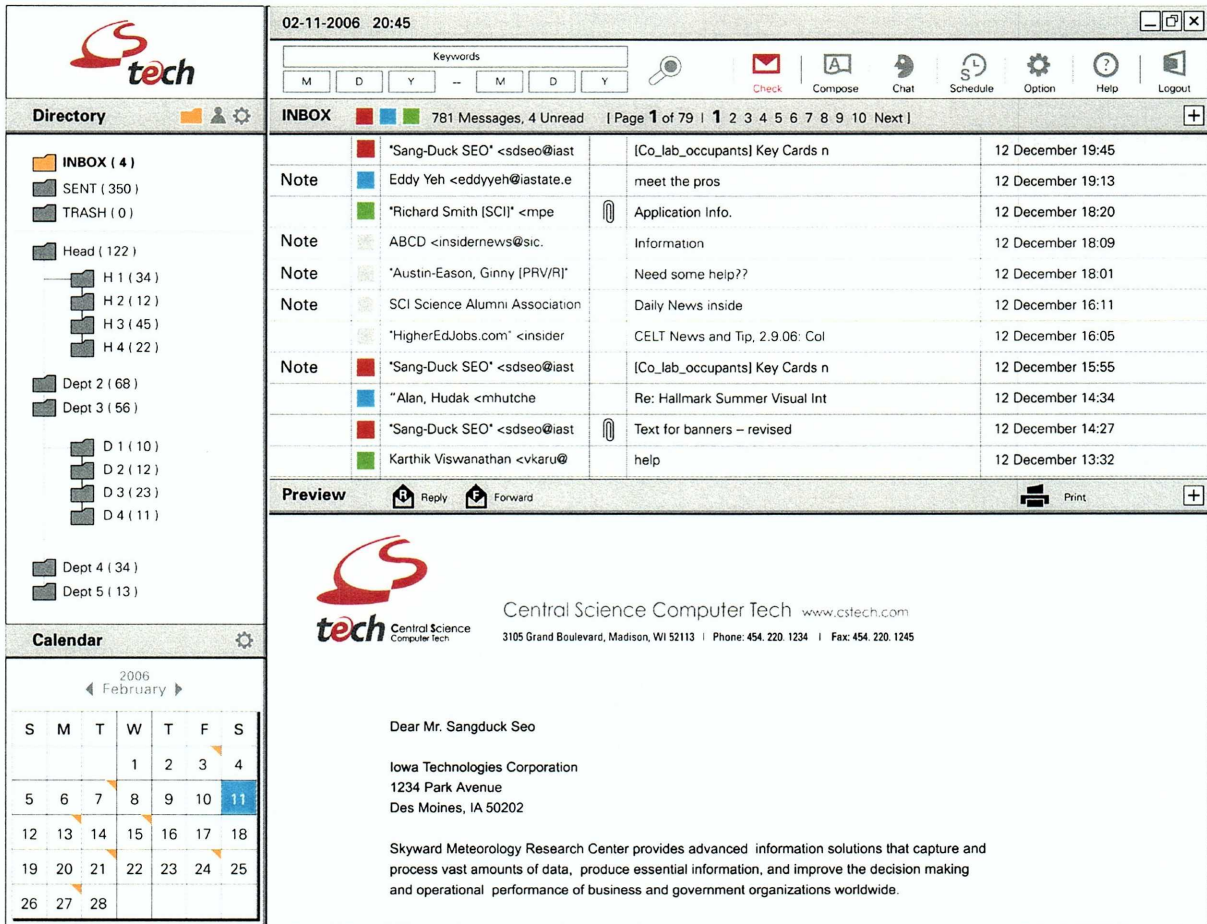


Figure 33. Main Window Display

c. Color

“Colors are more than a combination of red and blue or yellow and black. They are non-verbal communication. Colors have symbolism and color meanings that go beyond ink.”⁹⁹ Color is one of most important elements of interface design. “Color is a good tool for communicating information in a user interface.”¹⁰⁰ This prototype design used a gray and postal tone for the wide space, and small space with various spot colors such as orange, red,

⁹⁹ www.desktoppub.about.com/cs/color/a/symbolism.htm

¹⁰⁰ www.developer.gnome.org/projects/gup/hig/1.0/layout.html#color

green, and blue. “The GNOME Usability Project” addresses three examples where color can be used to:

- strengthen a desktop's look and feel by enhancing a theme
- accent a dynamic alert in a system management application
- emphasize an element in a long list to expedite scanning
- add aesthetically pleasing details to an icon

This researcher considered a gray tone as menu bar and fundamental color. “Gray is a neutral, balanced color. It is a cool, conservative color that seldom evokes strong emotion although it can be seen as a cloudy or moody color.”¹⁰¹ Red and orange colors are considered useful for a menu function that is working. Red usually gets people to pay attention to important information, and small doses can often be more effective than large amounts of this strong color.¹⁰² Pastel colors make text dominant when they are used as background colors. Users don’t have any problem reading text messages by using either warm or cool colors in terms of visual and functional aspects.

d. Icon Design

“Icons can be placed on a continuum from completely incomprehensible to readily comprehensible: an icon is completely incomprehensible if no users understand what it means, or readily comprehensible if more than 90% of users understand what it means without explanation.”¹⁰³

¹⁰¹ www.desktoppub.about.com/cs/colorselection/p/gray.htm

¹⁰² www.desktoppub.about.com/cs/colorselection/p/red.htm

¹⁰³ Haramundanis, Katherine ‘*Why Icons Cannot Stand Alone*’ Vol. 20, May 1996 ACM SIGDOC (pp1-8)

The Icon Book, Visual Symbols for Computer Systems and Documentation”¹⁰⁴ by Horton (1994) provides a practitioner's approach to the subject of icons and is filled with many good examples of both crude and excellent icons. Beware of using icons without providing written information about them. Horton stated that there are no universal icons in both his book and in his article on icons. In his book, Horton defines icons as "the small pictorial symbols used on computer menus, windows, and screens,"¹⁰⁵ and quite rightly limits his discussion of glyphs, symbols, signs, and signals to keep his work practical. Horton is right on many counts:

- icons are useful as reminders (cues).
- distinguishable icons can aid recognition.
- icons can save space on screen real estate.
- icons assist users whose native language is not English.

“No icon in a software product can stand alone and be understood by the global audience to which we must write; each icon must be supported by text, and for software this means translatable text to accommodate the needs of international audiences.”¹⁰⁶ The supporting text can be shown with the icon (underneath it, for example), or conceptually nearby in help text accessible by a mouse click, in printed paper documentation, or in text that appears in a special window at the bottom of the screen when the cursor is on the icon.

The new icon design is based on existing icons from online communication programs. Figure 34 shows an existing collection which needs to be improved for this study.

¹⁰⁴ Horton, William. (1994). *The Icon Book: Visual Symbols for Computer Systems and Documentation*. New York: John Wiley.

¹⁰⁵ Horton, William. (1993). *Figures of Image: Aristotle and the Design of Icons and Hypermedia*. *Technical Communication*, 40 (3, August), 495-499.

¹⁰⁶ Haramundanis, Katherine (pp1-8).



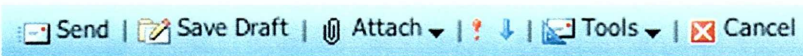
MSN IM Chat



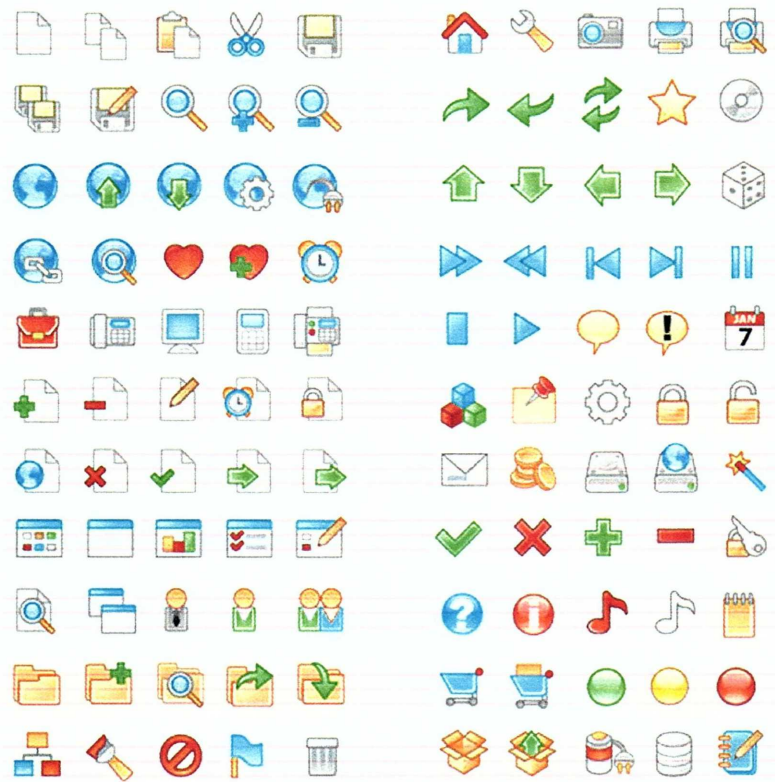
Eudora E-mail



Yahoo IM Chat



Hotmail.com



Basic Icons: Fasticon.com

© 2004 FASTICON.COM

Figure 34. Example of icon design

Navigation tools were designed as icons based on an abstract form of meaning.

Simplicity and clarity of the design principle were also main considerations to represent each symbol simply using the functional and aesthetical aspects. Figure 35 are created icons for the menu and navigation symbol based on its meaning. The form of each symbol identifies its function as a group underneath different categories. The main consideration for creating these symbols was to make them unified and simple.































				
Check	Compose	Chat	Schedule	Calendar (Day)
				
Calendar (Week)	Calendar (Month)	Alarm	Help	Option
				
Search	Logout	Print	Folder	Reply
				
Forward	Contact	Attachment	Volume	Send File
				
Letter	Post-it	E-card	Voice	Video
				
Template	Font	Size	Italic	Memo

Figure 35. Icon Design

Figure 36 shows the icons as a group to help users understand to navigate. This explains how to incorporate icons as to function and meaning in a group. The text below each icon makes it easier for users to understand about its visual and functional communication.

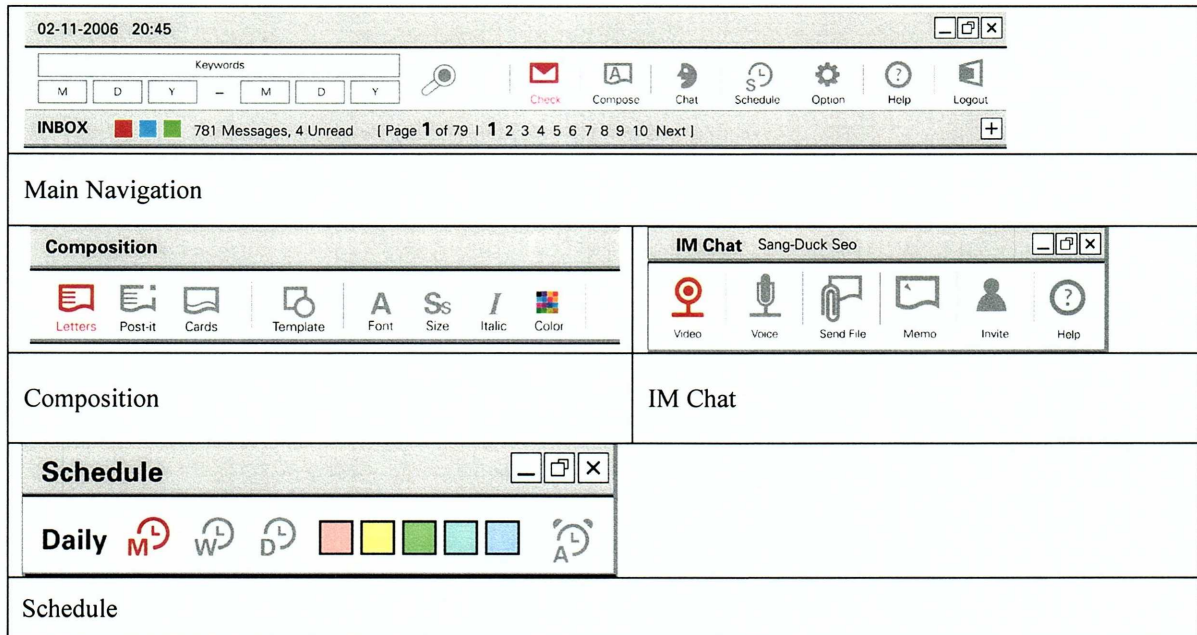


Figure 36. Icon Design (Main Menu)

The icons are also changed when it shown on different pages. Rollover to changing to a red color indicates users navigating each menu. Basically gray color of the icon makes the entire design simple and consistent with visual elements such as line, mass and form. Dominant colors such as red, and orange represent a hierarchical structure, especially as a focal point. Users may not be confused with locations or directions to navigate.

2. Incoming

“Incoming” in this program means receiving a message from senders. It is mainly composed of an “Inbox” and “Directory.” The inbox includes a “Priority Category” and “Message Type” When users log in to their personal e-mail account, it shows a main inbox to

enable them to check their new messages. The main consideration in interface design was to enable it interact with other functions: the directory, calendar and search engine. Displaying all the different parts of a program in one window display gives users a better and more convenient method for their navigating.

a. Inbox

The “Inbox” is displayed to show incoming messages with a preview on the bottom. Users can define the number of messages and their priority categories with four different color definitions: red, blue, green and gray. The colors tell which messages are more important to the users. Users can define its color for different groups or individual contact lists. Figure 37 shows how these colors are incorporated between the contact lists and messages in the inbox.

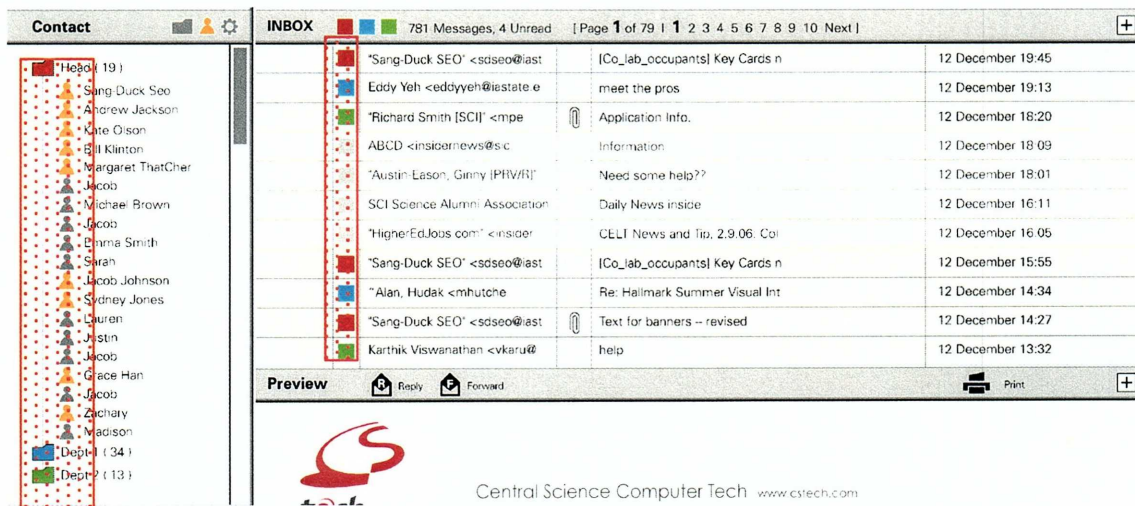


Figure 37. Inbox

b. Search

Finding the messages users received in the past was one of the major problems discovered by many researchers. Users mostly failed to find messages or they had a difficult time using the search options. This prototype provides an enhanced interface design and more options for users enabling them to conduct searches on the same page they are working on.

There are two different methods for searching for messages from inbox and folders. One is enables the user to put keywords or dates in the search box on the top of the menu bar. The other way is to find the messages based on the priority category. Figure 38 shows the search box design which enables users to put the text in the keyword box or a number of dates for a certain period. This is a more specific option that can bring the results out for users allowing them to search faster and more easily.

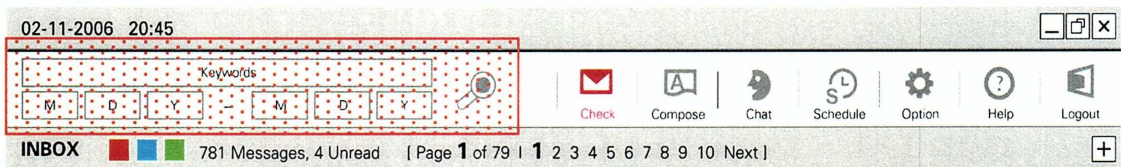


Figure 38. Search Box

Another method shown in Figure 39 is allows the user to select different colors based on a priority category. For instance, if the user selects the red on the bar of the inbox, the messages related to the red color of the contact group are displayed in the inbox. This method applies not only to the inbox, but also to other folders and directories.

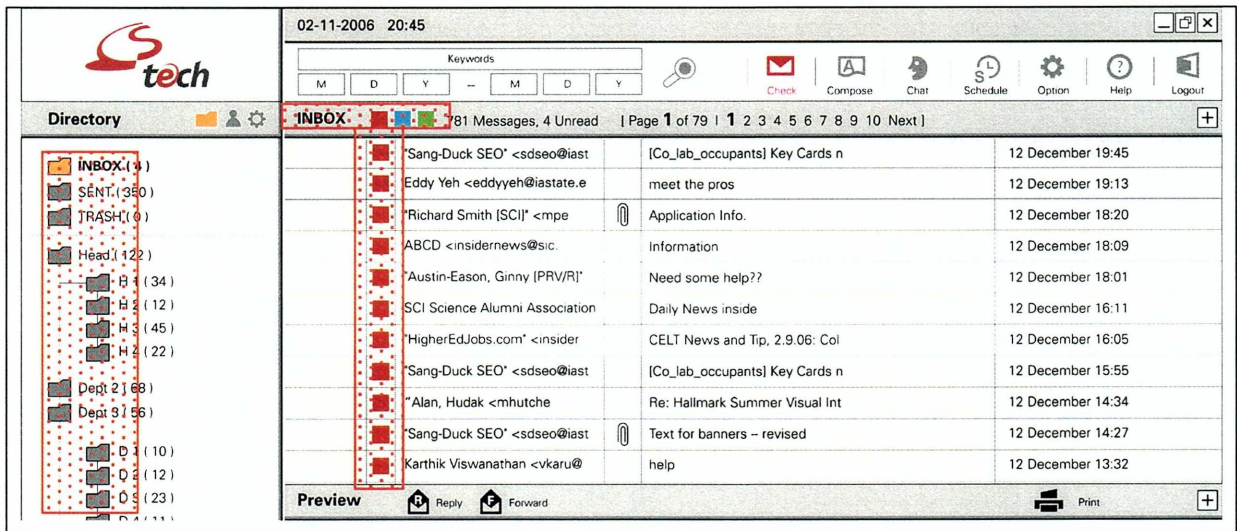


Figure 39. Search Box (Directory & Priority Category)


c. Message Preview

Most existing e-mail programs display incoming messages on the preview underneath the inbox. This display is a convenient and fast way which allows users to check their messages. The user can adjust the space between the “Inbox” and “Preview” of the messages (see Figure 40). The flame bar on the red box indicates the borderline. User can move up and down to adjust the space or click “+” on the right top corner of each flame bar (see Figure 41). When the full screen is on, the “+” changes to “-” to make it reverse back to the previews mode showing both the “Inbox” and “Preview.”

INBOX 781 Messages, 4 Unread [Page 1 of 79 | 1 2 3 4 5 6 7 8 9 10 Next]

Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 19:45
Note	Eddy Yeh <eddyeh@iastate.e>	meet the pros	12 December 19:13
	"Richard Smith [SCI]" <rmp>	Application Info.	12 December 18:20
Note	ABCD <insidernews@sic>	Information	12 December 18:09
Note	"Austin-Eason, Ginny [PRV/R]"	Need some help??	12 December 18:01
Note	SCI Science Alumni Association	Daily News inside	12 December 16:11
	"HigherEdJobs.com" <insider>	CELT News and Tip, 2.9.06: Col	12 December 16:05
Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 15:55
	"Alan, Hudak <mhutche>	Re: Hallmark Summer Visual Int	12 December 14:34
	"Sang-Duck SEO" <sdseo@iast>	Text for banners - revised	12 December 14:27
	Karthik Viswanathan <vkaru@>	help	12 December 13:32

Preview Reply Forward Print



Central Science Computer Tech www.cstech.com
3105 Grand Boulevard, Madison, WI 52113 | Phone: 454.220.1234 | Fax: 454.220.1245

Dear Mr. Sangduck Seo

Iowa Technologies Corporation
1234 Park Avenue
Des Moines, IA 50202

Skyward Meteorology Research Center provides advanced information solutions that capture and process vast amounts of data, produce essential information, and improve the decision making and operational performance of business and government organizations worldwide.

Figure 40. Message Preview


<p>INBOX 781 Messages, 4 Unread [Page 1 of 79 1 2 3 4 5 6 7 8 9 10 Next]</p> <table border="1"> <tr> <td>Note</td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>[Co_lab_occupants] Key Cards n</td> <td>12 December 19:45</td> </tr> <tr> <td>Note</td> <td>Eddy Yeh <eddyeh@iastate.e></td> <td>meet the pros</td> <td>12 December 19:13</td> </tr> </table> <p>Preview Reply Forward Print</p> <div>  <p>Central Science Computer Tech www.cstech.com 3105 Grand Boulevard, Madison, WI 52113 Phone: 454.220.1234 Fax: 454.220.1245</p> <p>Dear Mr. Sangduck Seo</p> <p>Iowa Technologies Corporation 1234 Park Avenue Des Moines, IA 50202</p> <p>Skyward Meteorology Research Center provides advanced information solutions that capture and process vast amounts of data, produce essential information, and improve the decision making and operational performance of business and government organizations worldwide.</p> <p>Focused on markets and customers with strong repeat business potential, Skyward Meteorology Research Center delivers a broad spectrum of Earth and space based information solutions, ranging from complex operational systems, to tailored information services, to electronic information products.</p> <p>The Company operates through two reporting units: Information Products and Information Systems. Skyward Meteorology employs over 2500 people through offices in the United States, the United Kingdom, and Canada. The Company's common shares trade on the Toronto Stock Exchange under the symbol "Skyward"</p> <p>We prefer to receive your resume electronically using our on-line application process. If you are unable to apply online, fax your cover letter stating the position for which you are applying and a current resume to 454.220.1245</p> </div>	Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 19:45	Note	Eddy Yeh <eddyeh@iastate.e>	meet the pros	12 December 19:13	<p>INBOX 781 Messages, 4 Unread [Page 1 of 79 1 2 3 4 5 6 7 8 9 10 Next]</p> <table border="1"> <tr> <td>Note</td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>[Co_lab_occupants] Key Cards n</td> <td>12 December 19:45</td> </tr> <tr> <td>Note</td> <td>Eddy Yeh <eddyeh@iastate.e></td> <td>meet the pros</td> <td>12 December 19:13</td> </tr> <tr> <td></td> <td>"Richard Smith [SCI]" <rmp></td> <td>Application Info.</td> <td>12 December 18:20</td> </tr> <tr> <td>Note</td> <td>ABCD <insidernews@sic></td> <td>Information</td> <td>12 December 18:09</td> </tr> <tr> <td>Note</td> <td>"Austin-Eason, Ginny [PRV/R]"</td> <td>Need some help??</td> <td>12 December 18:01</td> </tr> <tr> <td>Note</td> <td>SCI Science Alumni Association</td> <td>Daily News inside</td> <td>12 December 16:11</td> </tr> <tr> <td></td> <td>"HigherEdJobs.com" <insider></td> <td>CELT News and Tip, 2.9.06: Col</td> <td>12 December 16:05</td> </tr> <tr> <td>Note</td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>[Co_lab_occupants] Key Cards n</td> <td>12 December 15:55</td> </tr> <tr> <td></td> <td>"Alan, Hudak <mhutche></td> <td>Re: Hallmark Summer Visual Int</td> <td>12 December 14:34</td> </tr> <tr> <td></td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>Text for banners - revised</td> <td>12 December 14:27</td> </tr> <tr> <td></td> <td>Karthik Viswanathan <vkaru@></td> <td>help</td> <td>12 December 13:32</td> </tr> <tr> <td>Note</td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>[Co_lab_occupants] Key Cards n</td> <td>12 December 19:45</td> </tr> <tr> <td>Note</td> <td>Eddy Yeh <eddyeh@iastate.e></td> <td>meet the pros</td> <td>12 December 19:13</td> </tr> <tr> <td></td> <td>"Richard Smith [SCI]" <rmp></td> <td>Application Info.</td> <td>12 December 18:20</td> </tr> <tr> <td>Note</td> <td>ABCD <insidernews@sic></td> <td>Information</td> <td>12 December 18:09</td> </tr> <tr> <td>Note</td> <td>"Austin-Eason, Ginny [PRV/R]"</td> <td>Need some help??</td> <td>12 December 18:01</td> </tr> <tr> <td>Note</td> <td>SCI Science Alumni Association</td> <td>Daily News inside</td> <td>12 December 16:11</td> </tr> <tr> <td></td> <td>"HigherEdJobs.com" <insider></td> <td>CELT News and Tip, 2.9.06: Col</td> <td>12 December 16:05</td> </tr> <tr> <td>Note</td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>[Co_lab_occupants] Key Cards n</td> <td>12 December 15:55</td> </tr> <tr> <td></td> <td>"Alan, Hudak <mhutche></td> <td>Re: Hallmark Summer Visual Int</td> <td>12 December 14:34</td> </tr> <tr> <td></td> <td>"Sang-Duck SEO" <sdseo@iast></td> <td>Text for banners - revised</td> <td>12 December 14:27</td> </tr> <tr> <td></td> <td>Karthik Viswanathan <vkaru@></td> <td>help</td> <td>12 December 13:32</td> </tr> </table>	Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 19:45	Note	Eddy Yeh <eddyeh@iastate.e>	meet the pros	12 December 19:13		"Richard Smith [SCI]" <rmp>	Application Info.	12 December 18:20	Note	ABCD <insidernews@sic>	Information	12 December 18:09	Note	"Austin-Eason, Ginny [PRV/R]"	Need some help??	12 December 18:01	Note	SCI Science Alumni Association	Daily News inside	12 December 16:11		"HigherEdJobs.com" <insider>	CELT News and Tip, 2.9.06: Col	12 December 16:05	Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 15:55		"Alan, Hudak <mhutche>	Re: Hallmark Summer Visual Int	12 December 14:34		"Sang-Duck SEO" <sdseo@iast>	Text for banners - revised	12 December 14:27		Karthik Viswanathan <vkaru@>	help	12 December 13:32	Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 19:45	Note	Eddy Yeh <eddyeh@iastate.e>	meet the pros	12 December 19:13		"Richard Smith [SCI]" <rmp>	Application Info.	12 December 18:20	Note	ABCD <insidernews@sic>	Information	12 December 18:09	Note	"Austin-Eason, Ginny [PRV/R]"	Need some help??	12 December 18:01	Note	SCI Science Alumni Association	Daily News inside	12 December 16:11		"HigherEdJobs.com" <insider>	CELT News and Tip, 2.9.06: Col	12 December 16:05	Note	"Sang-Duck SEO" <sdseo@iast>	[Co_lab_occupants] Key Cards n	12 December 15:55		"Alan, Hudak <mhutche>	Re: Hallmark Summer Visual Int	12 December 14:34		"Sang-Duck SEO" <sdseo@iast>	Text for banners - revised	12 December 14:27		Karthik Viswanathan <vkaru@>	help	12 December 13:32
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Figure 41. Adjusting the Space

d. Directory

The “Directory” is composed of two parts: the “Folder” and “Contact.” Each directory can be selected by using the menu icons on the top of the directory menu bar. The orange color indicates that it is active. Figure 42 “Directory Menu” shows how it works when users select different parts of the menu. Through the option icon or mouse click option, users can create new folders and contact lists.



Figure 42. Directory Menu

Folder: Users can create unlimited number of folders and sub-folders, which will help users organize and manage their incoming messages.

Contact List: The directory interacts with IM messenger functions. The orange color indicates that users’ contacts are online; the gray color means they are offline. Clicking on the online contact list enables users to chat on IM (Instant Messenger) directly. If users

conduct it into an offline contact list, it enables users to leave a message through the “Post-it” function. Also, by dragging one of the icons from the contact list into the address box, the user’s e-mail address will appear directly. This function is very convenient and much faster than opening the contact address book.

Group Folder: The group folder identifies different groups based on different colors: red, blue and green. Users can create more folders with different colors as an optional function.

Option: To change a contact’s information or to create a new contact list, users can go with the icon for the functional option or mouse click option using both ways.

3. Additional Functions

a. IM (Instant Messenger)

IM (Instant Messenger) defines a synchronous communication. There are a lot of benefits to using this function in online communication. Inserting IM into an e-mail program would help workers in two ways: there would be a quicker response and it would also reduce the number of e-mail messages from the inbox. Through research, the heavy work load in a company is especially difficult to deal with since workers have an average of 200 messages a day. This IM would allow users to reach others directly without consideration of the time and distance.

According to Figure 43, users can do text, voice and video chat. Users can also send and receive a file through an attachment called “Send File.” There is also a “Memo” that saves the users’ conversation or notes from their video or voice chat. The menu function “Invite” permits more than one group.

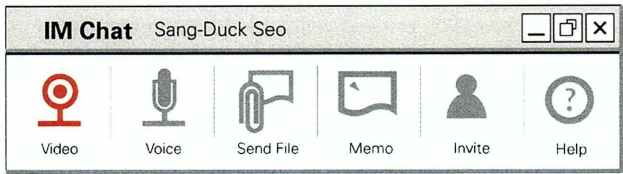


Figure 43. IM Chat Menu

Interface design considers unifying one application window with the e-mail function.

Figure 44 shows how the menu and application display on the screen interact with other contacts.

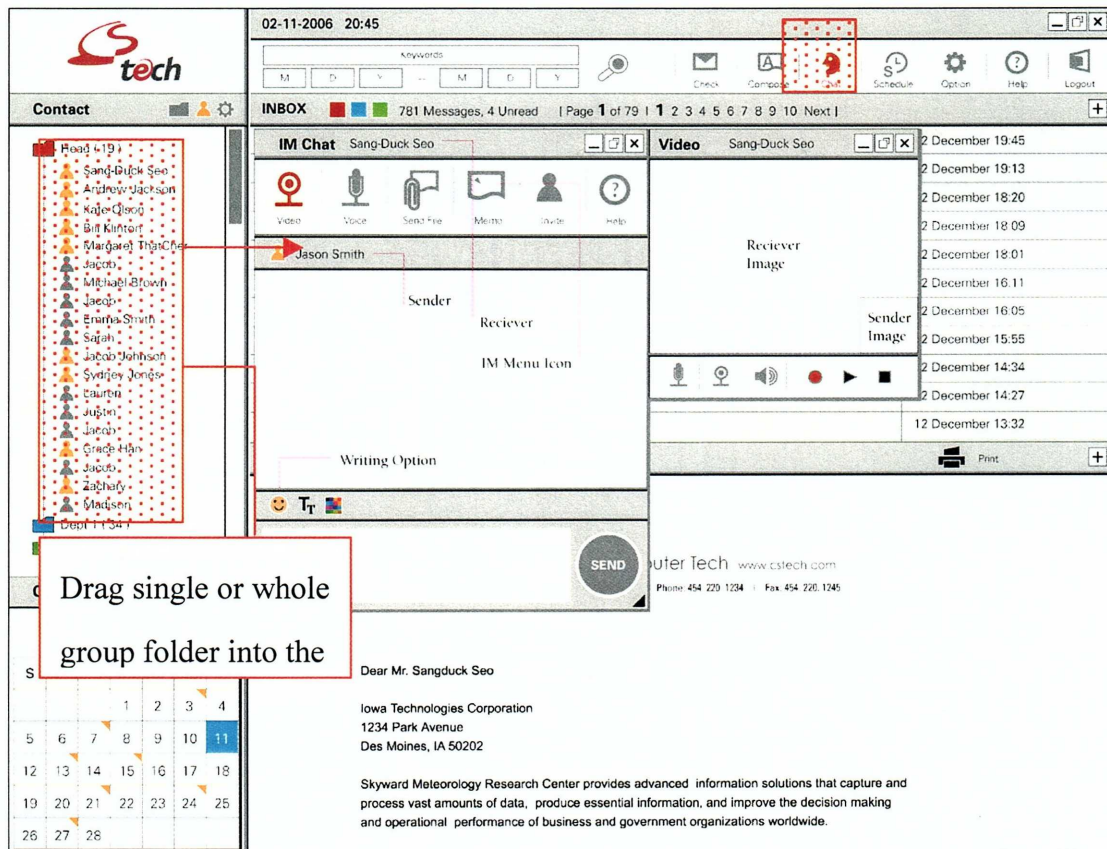


Figure 44. IM Chat Application

To conduct the IM chat function, users can click either the “Chat” icon or contact name with the icon from the contact list directory. If users need to talk to more than one contact, they can drag the personal name in the contact list into the IM window. This enables users to communicate with groups as they do in a chat room. Basically, users can communicate with text messages. However, they can choose voice talk and video conversation which is face-to-face. When users select video chat, the video image window is shown beside the text messenger screen. In video chat, users can also do multiple-group chatting. While using video chat, users can record their conversations in order to save important discussions. This would be a good function to have for business purposes around the world. It saves both time and money for business expenses.

b. Calendar

“Calendar” means that users can manage their schedule and organize their “To-do list”. Most current e-mail programs don’t contain this function and users have to operate both programs separately. This method is sometimes inconvenient with users are going back and forth. Figure 45 introduces the design and its functions. The “Calendar” is shown on the bottom left side under the directory (see Figure 45).

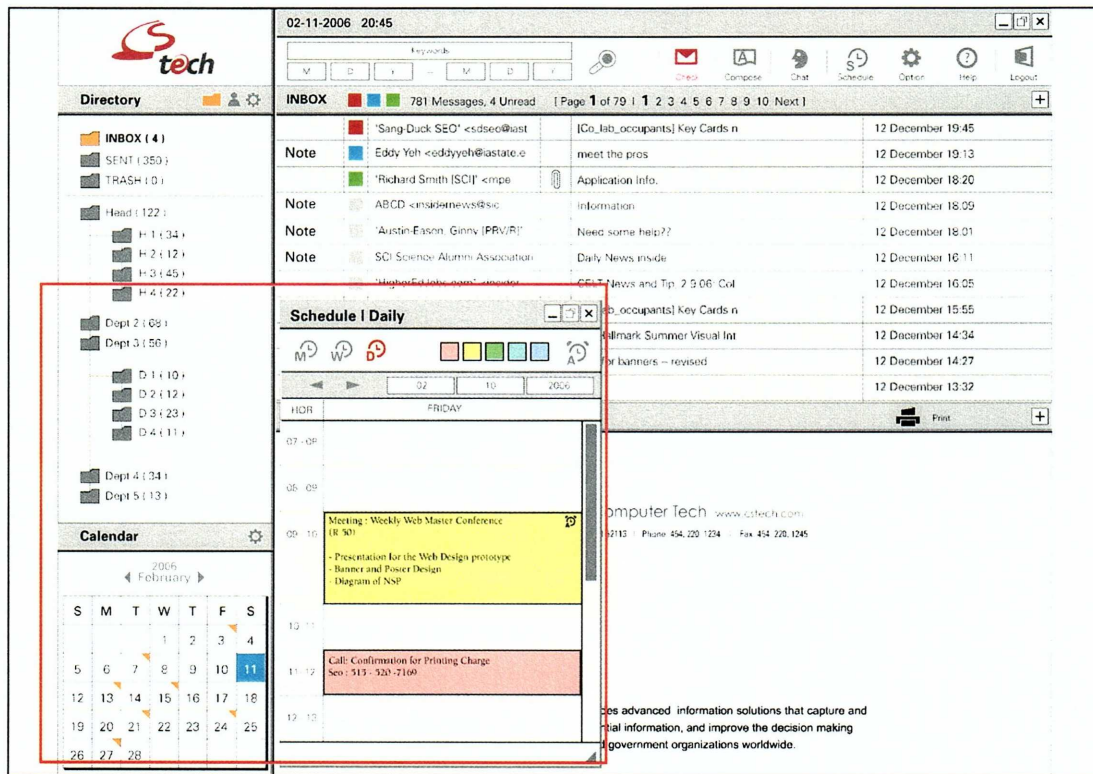


Figure 45. Calendar Design

This calendar shows the whole month's schedules and the blue color on the box indicates today's date. Users can also check the previous and next month's schedule by using the clickable arrow button on the top. The yellow triangle shape in the corner identifies it as an important schedule. Users can also set up the alarm function from the option.

When users click a date on the calendar, it takes them to the "Schedule". The "Schedule" is composed of daily, weekly and monthly information. In the daily schedule section, users can create their own to-do list. There are also five different color options that can be defined by users. For instance, yellow could identify meetings and red could mean important appointments. These will be shown as background colors with a black text. User can easily recognize the different categories of the schedule with a certain color before

reading the exact messages or contents. Figure 46 shows the monthly and weekly schedule section. It also contains a summary of each day's schedule on the weekly schedule.

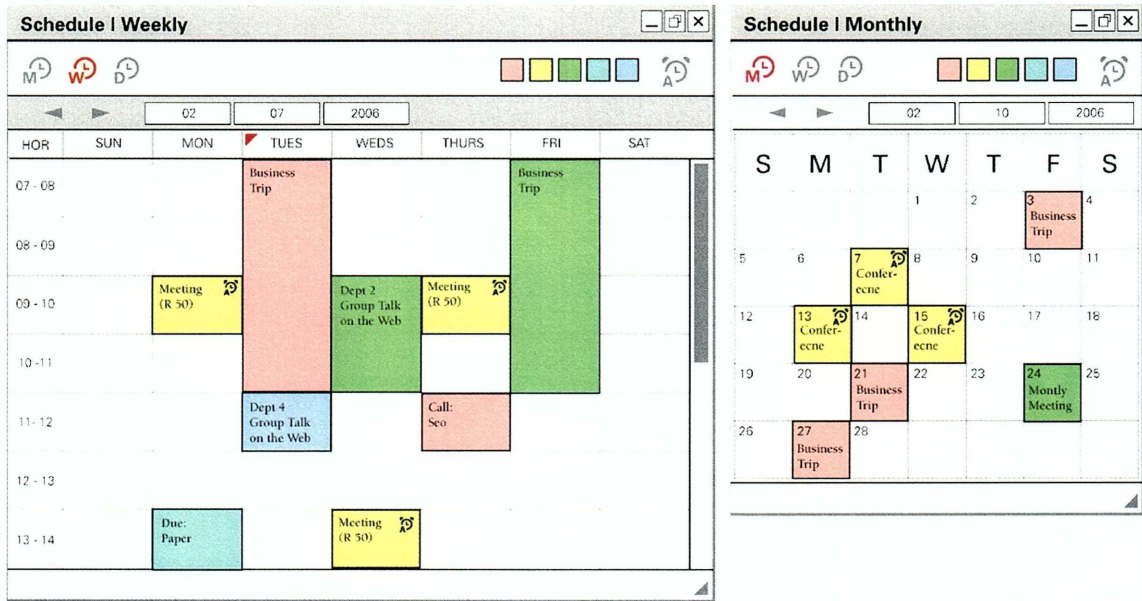


Figure 46. Schedule-Monthly and Weekly

Users can also see other weeks' schedules by clicking on an arrow button or clicking on certain dates. The monthly schedule shows the most important meetings or events from the schedule. It also has an alarm to remind people to see their important appointments in their schedule.

4. Outgoing

"Outgoing" states the fact that users can create their messages in e-mail. In this study, "Outgoing" was developed more in order to solve the problems addressed in earlier research. The problems were based on research and surveys from other researchers and considered how to deal with a lot of messages from the outside: Junk, Spam, advertising, etc. Creating

different type of messages for different purposes is key to being able to reduce the number of e-mails everyday. This would enable users to distinguish important messages from unnecessary e-mails. Distinctive messages will determine if e-mails are important, urgent, business, personal contacts, etc.

There are three different types of compositions: “Letter”, “Post-it” and “E-card”. Users can choose a different composition depending on its purpose. Sending and receiving a text message sometimes has problems which lead to confusion and inconvenience from using other programs. This will allow users to be able to create different types of messages in one application.

a. Letter

The “Letter” is a default composition and creates messages using a text base. In this study, the “Letter” provides two different options for users to be able to create formal and informal types of messages. Figure 47 shows the entire design layout for the “Outgoing”. It shows the composition menu on the top of the application.

When users select “Composition”, the default page is shown on the main page. This way people can create basic html text messages and send attached files along with the message. Receivers can be taken from the contact list or selected from the address book. The difference between the contact list and address book is the order of the contacts’ names. The “Contact List” is organized by grouping or using the address book which lists the names in alphabetical order. Users can choose either – which ever feels easier or more convenient.

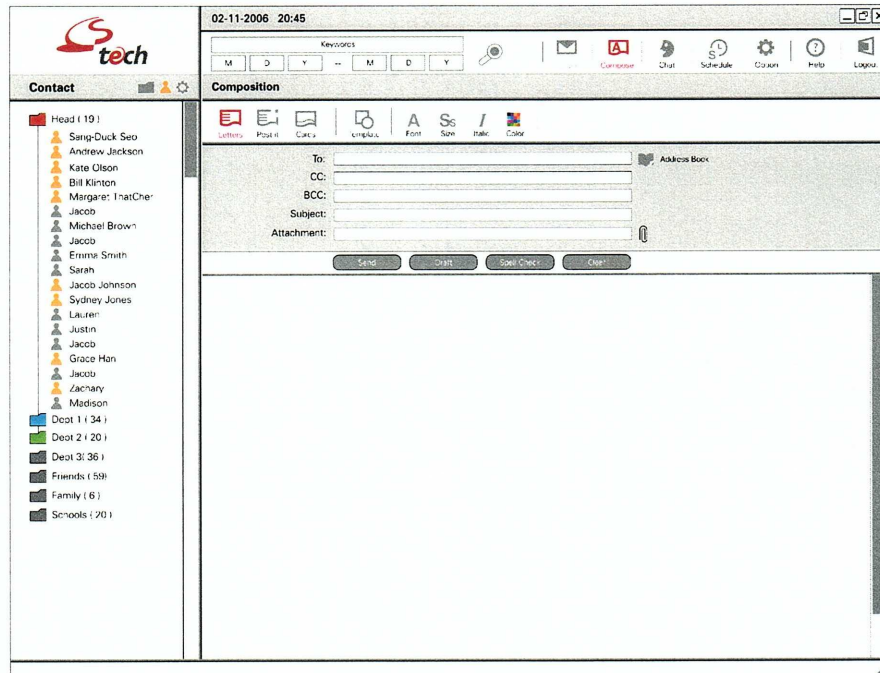


Figure 47. Outgoing

When users select “Composition”, the default page is shown on the main page. This way people can create basic html text messages and send attached files along with the message.

Receivers can be taken from the contact list or selected from the address book. The difference between the contact list and address book is the order of the contacts’ names. The “Contact List” is organized by grouping or using the address book which lists the names in alphabetical order. Users can choose either – which ever feels easier or more convenient.

Template: The “Template” is also provided to enable user to create a formal letter as a business letter. It often occurs that people should send formal or official letters for their business.

Composition

Letters Post-it Cards Template Font Size Italic Color

To: Address Book

CC:

BCC:

Subject:

Attachment:

Send Preview Draft Spell Check Clear

Logo: Load the logo image Load

Name: Type a sender's name

Address: Street name and number

City / State / Zip code

Phone:

Fax:

Signature: Load the personal signature image Load

Type here

Figure 48. Template (Formal Letter)

Currently, an online user creates it from different program such as Word or PDF and attaches it in order for receivers to read it. This is because text messages are only based on html language. Figure 48 shows how to make it possible to create a business letter using this e-mail program. It requires users to fill out the sender's information such as the company logo, name, address, phone number and signature which they save as a digital image. Following each step is fast and easy and users will see a preview using the function button.

b. Post-it

"Post-it" is a kind of memo. The purpose of this function is to reduce the large number of e-mails among the users who are using the same program. The messages received

from others remain in the opened window before they close the message's box. "Post-it" is designed as a simple and clear interface in order to use it easily and fast (see Figure 49).

There are five different color options for the background; it basically shows a white background and users can choose different colors such as yellow, orange, green and blue.

User can write short notes based on text version. There is an option on the menu bar for different fonts and sizes.

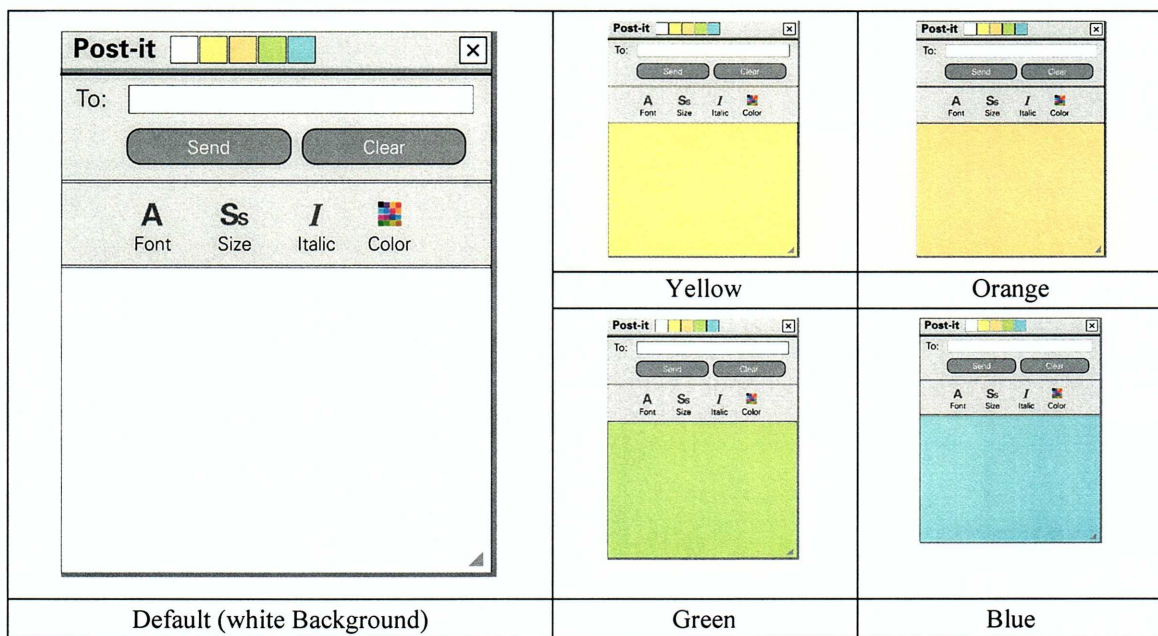


Figure 49. Post-it

"Post-it" can replace phone calls reducing the amount of work in a company. Imagine how frustrating it is if a worker can't reach another to deliver an important message.

Sometimes, they may be away from their desk, and the employee has no idea how to contact them. They often use a phone call to ask short questions or to deliver urgent messages.

Reaching someone's office phone is sometimes more difficult because the line is busy or he or she has to find the phone number in the telephone book. In another situation, an employee

might want to talk to someone in the same office, but they have to walk to that person's office only to find that that person is away from their desk. All these situations make workers tired of doing their job over and over when things don't sometimes go well. Thus, this "Post-it" function can be useful for workers because many companies provide the same kind of e-mail program for their employees.

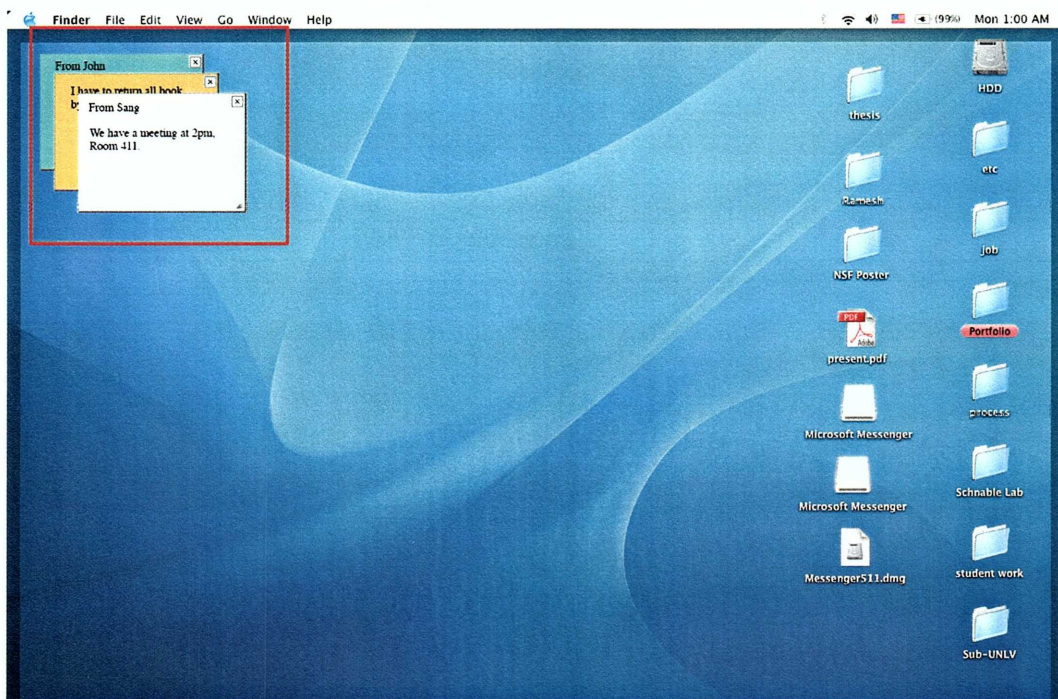


Figure 50. Post-it (Receiver's Window Display)

Figure 50 is the window displays how post-it shows when a short message is delivered. The user can also create a short memo and send oneself e-mail account for reminding "to-do things." If users use the same e-mail program, this function would help to solve problems such as having a full inbox with a lot of unnecessary messages. It has shown great interaction between users, and can sometimes replace e-mail messages.

In addition, users can set up a function to forward received messages to their cell phone automatically. This might be a more convenient way when we are away from the computer. Cell phones already have text message delivery service. Many free online IM messenger services have tried to provide an interactive communications between computers and cell phones for mobile communication. Cell phones are not only for voice conversation any more, especially since many cell phone communication companies offer free or cheaper charges for text delivery service. Among the young generation, text messaging is really popular and using it saves them a lot of money. Thus, “Post-it” would enable users not only to deliver more simply important or urgent messages, but also reduce the number of e-mails in their inbox.

c. E-cards

E-cards currently provide free or membership service online. Based on research and analysis of contemporary online services, using e-card services was found to be inconvenient, time consuming, and having too many options when trying to choose the one that users want to create. Most e-cards services provide animation with pictures, illustrations or texts. Users have to spend more time in order to look for the card they would like to send. The categories which are based on themes aren’t clear enough and many overlap with similar features and examples. Most e-cards are funny and have pleasant themes and it is difficult to find the right types of cards. As we know, life is not always funny. We sometimes may need to send a sympathy card or other types of cards to people. In this case, we have to consider expressing our emotions such as sadness, apology, worry, etc.

The benefits of e-cards have enabled users to save time and money. If someone or a company has to send cards to a lot of people, it takes a long time to prepare all of them and they have to spend a lot of money to buy cards and stamps. The event is not just only one time a year for each person or company. There are many events during the year such as holidays, birthdays, anniversaries, etc., and it is really difficult to remember all these dates and to pay all the postage.

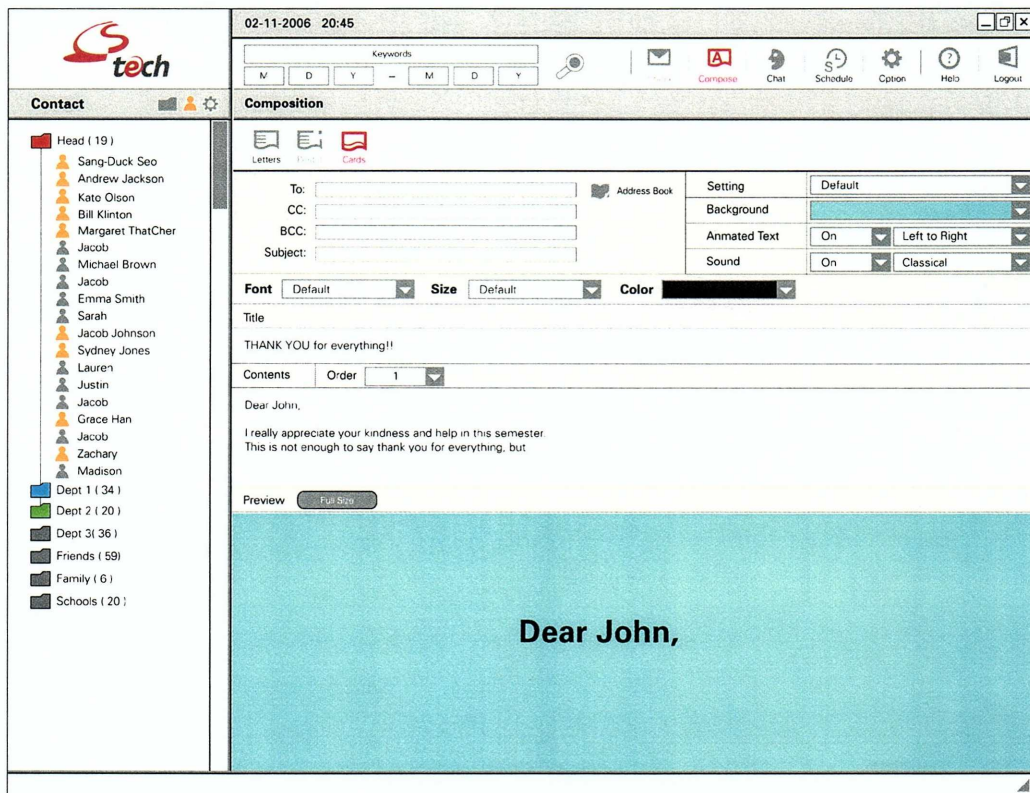


Figure 51. E-cards

The main purpose of e-cards for e-mail application is to enable users to create kinetic messages easily and conveniently. This study also tried to enhance its function, but it is simple for users to take the short step to create animated text messages. Users can select

different options for the different types of cards. Figure 51 is the layout design for e-card application. The navigation menu was considered to be consistent from the order where users can select the option step-by-step. Users can also see a preview while they are creating e-cards messages. It shows how the sender's messages will be presented when the e-card is delivered.

For directions how to use this application, a drop menu bar is provided with more options which users can choose. Users can select the receiver's address through the address book or contact list in the directory. People can also send messages to multiple persons or groups. The e-cards' message will appear in the receiver's inbox as an attached file if the receiver uses a different e-mail application. However, it appears directly for the receiver using with the same applications. Users using the same application will be notified through an e-card message in their mailbox.

Step 1: Setting Menu

After users choose the receiver's address, they can move to the next step of creating a the type of e-card. The first step is "Setting Menu" which provides different types of cards (see Figure 52). "Setting Menu" basically provides four different types such as thank yous, celebrations, sympathy and invitations. Each category is already set up following options such as the background color, animated text and sound. Users can modify it based on their own creation or they can select different options that they prefer.

Setting	Default		Setting	Default	
Background			Background	Thank you	
Anmated Text	On	Left to Right	Anmated Text	Celebrations	
Sound	On	Classical	Sound	Sympathy	
				Invitations	
				Saving as Set	
Setting Menu			Setting Options on the Drop Menu		

Figure 52. Setting Menu

However, users can also create their own type of e-cards. Once it shows as a default, users can type the name of the e-card, and select the “Saving as Set” in the drop menu. This is an easy and fast way for users to create different types of e-card for different purposes.

Step 2: Background Color

“Background Color” uses seven different colors for basic setting: white, gray, black and bright colors (see Figure 53). Users can choose one of the colors if they wish to create a new type of card. Users can also select more colors from the “More Color Options” on the menu bar. Once users select one of the categories on the setting menu, it shows a defined color based on different types of cards; otherwise, it shows a white color as the default setting.

Setting	Default
Background	
Anmated Text	
Sound	
	More color options

Figure 53. Background Color

Step 3: Animated Text

“Animated Text” is a kind of kinetic typography. It shows more dynamic and active movement on the screen. Figure 54 shows the full options for the types of movement. Users can select different options which are composed of three different categories: “Move”, “Size” and “Fade”.

Address Book	Setting	Default		Small - Large	
	Background			Large - Small	
	Animated Text	Move	▶ Left - Right	Small - Large	
	Size	▶ Left - Right	Text Size		
	Fade	◀ Right - Left	In - Out		
		▼ Top - Bottom	In - Out		
		▲ Bottom - Top	Out - In		
		~ Wave			
		⌚ Rotate			
Text Move			Text Fade		

Figure 54. Animated Text

The option of “Move” contains six different directions: left, right, top, bottom, wave and rotate. There are also small icons in order to help users understand the definitions clearly. “Size” is the function for making the text different sizes from small to large while it is playing on the e-card’s message. It appears as an attractive contrast with text messages created by the users. Users can also choose “Fade” function in order to have text messages appear and disappear. This function is useful when someone needs to send messages which convey his/her emotions, especially for a sympathy card.

Step 4: Sound

After choosing all options, users can select different types of sound that are provided by the manufacturer installed in the program (see Figure 55). Users initially select one of two different categories from the drop menu.

Setting	Default	
Background		
Animated Text	Move	Left - Right
Sound	Emotion	Happy
	OFF	Happy
	Emotion	Love
	Event	Sad
		Surprise
		Anger
		Update Emotion
Sound Option		Event

Emotion	Happy
OFF	Happy
Emotion	Love
Event	Sad
	Surprise
	Anger
	Update Emotion
Emotion	
Event	Happy New Year
OFF	Happy New Year
Emotion	Birthday
Event	Congratulations
	Sympathy
	Thank you
	Update Event

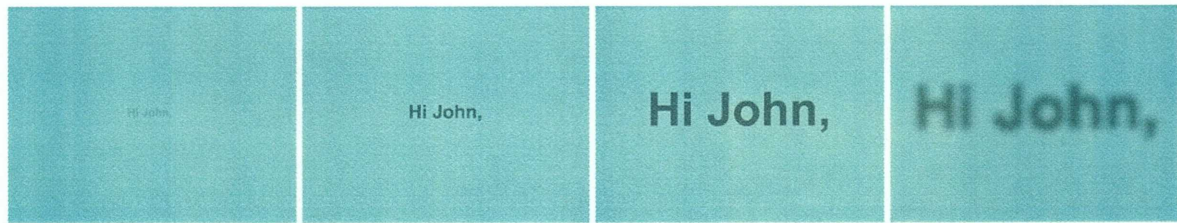
Figure 55. Sound

“Emotion” are the music categories related to human’s feelings and emotions. There are various options such as happy, love, sad, surprise and anger. Through the “Menu Option” or “Update Emotion,” users can modify or create their own music or sound. This is a significant identification to be able to express their feelings in the message they create. However, there is another option for selecting sound. There are five different categories: Happy New Year, birthdays, congratulations, sympathy and thank yous. Users can also create their own sound by downloading from an online service or loading the sound from their own computer.

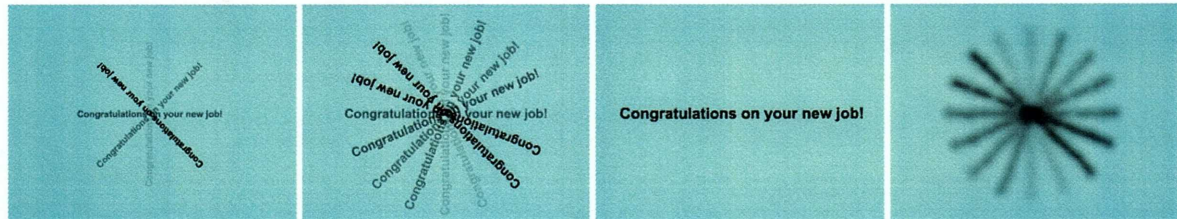
Examples: E-card Message

Figure 56 shows an example e-card message. The receiver can read the messages as an animated text message that a sender creates. Messages appear in each paragraph that the sender defines. “A” to “F” from Figure 56 explains selected options such as “Move”, “Fade”, and “Size.”

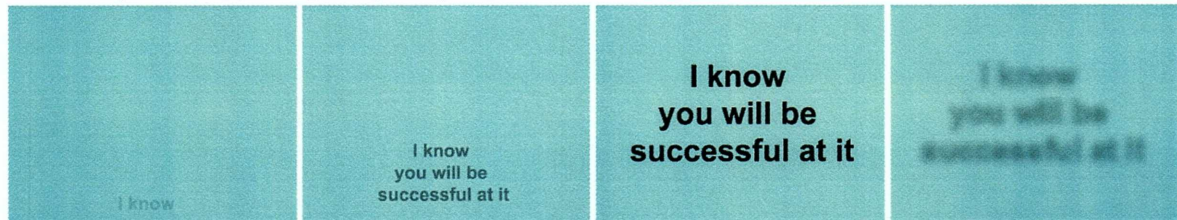
This e-card is created as using only text. Showing animated text from each message enables readers to understand more of the message's context. This researcher believes that using additional images in this e-card might make it too complicated. Empty background as one color chosen makes the text messages clearer and easier to understand. Other reasons for not providing images in the e-card program include saving time and providing a simple design for the animated card. Current e-card programs provide many different styles of cartoon cards. There are also a lot of categories for various events or situations. Users may have to spend too much time finding the right card they want to send. This makes it difficult and inconvenient to use e-card through the online service. Once a user is frustrated from a bad experience, she/he would never come back again to use its service.



A. Select Option: Fade(In-Out), Size(Small-Large)



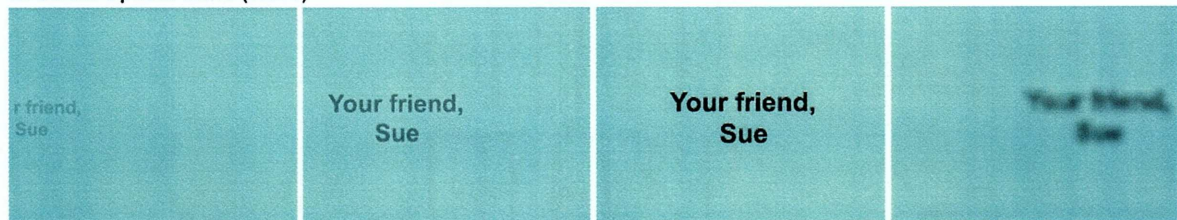
B. Select Option: Move(Rotate), Fade(In-Out)



C. Select Option: Move (Bottom - Top), Fade(In-Out)



D. Select Option: Move (Wave)



E. Select Option: Move(Left-Right), Fade(In-Out)



F. Review of the message

Figure 56. Example of E-card Message

CHAPTER 4. CONCLUSION

Online communication has been developing in our society and without a doubt it is a vital communication tool in our life. Interactive design for online communication is one of the most important tasks in order to develop enhanced communication for the future. The idea of creating a new environment for an e-mail program was based on current online communication programs being used by a large number of users in business and individually.

The proposed functions and interface designs of the new e-mail program focused on the main interaction between “Incoming” and “Outgoing.” During the study, several factors were considered for each menu: design principles, colors, form, function, and information hierarchy. The prototype of the e-mail program shows the overall interactive interface design and methods for using the program and function.

This study addressed the important reasons why we need to improve and develop e-mail communication methods and its environment. The new prototype enables users to communicate using both synchronous and asynchronous communication methods. The most significant improvement of the prototype was combining all the useful online communication programs: e-mail, e-card, IM chat, Calendar, and Post-it. This prototype would be useful programs for business workers who are using the same program.

Reflecting on the questions this research addressed, the proposed prototype solved the disadvantages of the current e-mail programs. The following are solutions for improvement of e-mail programs:

1. Creating different types of messages such as a business letter, memo, and animated text message: this result reduces the number of e-mail messages and replaces phone calls or direct contact with people.
2. Simple and organized interface and window layout: easy and convenient to navigate the menu and more user-friendly.
3. Thread-Map (folders and contact list based on a priority order): an efficient method to manage and organize messages and contact lists.
4. Unifying communication tools: synchronous and asynchronous communication methods.

This study reveals a greater potential environment for online communication and motivation to invent all new technology for a better network service. High-speed internet and computer technology will make this program work possible. Many researchers have been studying each of the areas related to an online network. As potential of future study from this research, usability testing and each specific part of the prototype may need to be developed. Also Mobile Network communication would be another consideration to interact with online communication for future study.

APPENDIX

Prototype Design 1. Main page:

02-11-2006 20:45

Directory

- INBOX (4)**
- SENT (350)
- TRASH (0)
- Head (172)
 - H 1 (34)
 - H 2 (12)
 - H 3 (45)
 - H 4 (22)
- Dept 2 (66)
- Dept 3 (56)
 - D 1 (10)
 - D 2 (12)
 - D 3 (23)
 - D 4 (11)
- Dept 4 (34)
- Dept 5 (13)

Calendar

2006
February

S	M	T	W	T	F	S
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

INBOX

761 Messages, 4 Unread [Page 1 of 79 | 1 2 3 4 5 6 7 8 9 10 Next]

In	To	Y	-	M	D	Y
[Red]	"Sang Duck SEO" <sdsseo@ast>					
[Blue]	Eddy Yeh <eddyyeh@astate>					
[Green]	"Richard Smith [SCJ]" <rsmpe>					
[Grey]	ABCD <mindsnews@sic>					
[Grey]	"Austin Eason, Ginny [PHV/R]"					
[Grey]	SCI Science Admin. Association					
[Grey]	"HigherEdJobs.com" <nmsider>					
[Red]	"Sang-Duck SEO" <sdsseo@ast>					
[Blue]	"Alan, Hudak <mihutche>					
[Red]	"Sang Duck SEO" <sdsseo@ast>					
[Green]	Karthik Viswanathan <vkaru@>					

Preview

Reply Forward

Central Science Computer Tech

3105 Grand Boulevard, Madison, WI 53713 Phone: 454 720 1234 Fax: 454 720 1245

Dear Mr. Sangduck Seo

Iowa Technologies Corporation
1234 Park Avenue
Des Moines, IA 50202

Skyward Meteorology Research Center provides advanced information solutions that capture and process vast amounts of data, produce essential information, and improve the decision making and operational performance of business and government organizations worldwide.

Prototype Design 2. Directory (Folders & Contact List)

02-11-2006 20:45

Contact
⚙️

Head (19)

- Sang-Duck Seo
- Andrew Jackson
- Kate Olson
- Bill Clinton
- Margaret Thatcher
- Jacob
- Michael Brown
- Jacob
- Emma Smith
- Sarah
- Jacob Johnson
- Sydney Jones
- Lauren
- Justin
- Jacob
- Grace Han
- Jacob
- Zachary
- Madison
- Dept 1 (34)
- Dept 2 (13)

Calendar
⚙️

2006
 ◀ February ▶

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

INBOX
🔍 | Page 1 of 79 | 1 2 3 4 5 6 7 8 9 10 Next |

781 Messages, 4 Unread

	M	D	Y	-	M	D	Y
[Red]	"Sang-Duck SEO"	<sdseo@iast					
[Blue]	Eddy Yeh <eddyeh@iastate.e						
[Green]	"Richard Smith [SCII]" <mpe						
[Grey]	ABCD <insidernews@isc						
[Grey]	"Austin-Eason, Ginny [PRV/R]"						
[Grey]	SCI Science Alumni Association						
[Grey]	"HigherEdJobs.com" <insider						
[Red]	"Sang-Duck SEO"	<sdseo@iast					
[Blue]	"Alan, Hudak <mhuitchie						
[Red]	"Sang-Duck SEO"	<sdseo@iast					
[Green]	Karthik Viswanathan <vkru@						

Preview
📧 Reply Forward

[Co_lab_occupants] Key Cards n

meet the pros

Application Info.

Information

Need some help??

Daily News Inside

CELT News and Tip, 2 9 06 Col

[Co_lab_occupants] Key Cards n

Re: Hallmark Summer Visual Int

Text for banners - revised

help

Print
🖨️ Print

Central Science Computer Tech

3105 Grand Boulevard, Madison, WI 52113 | Phone: 454.220.1234 | Fax: 454.220.1245

tech
Central Science Computer Tech

Dear Mr. Sangduck Seo

Iowa Technologies Corporation

1234 Park Avenue

Des Moines, IA 50202

Calendar
⚙️

2006
 ◀ February ▶

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Central Science Computer Tech
www.cstech.com

3105 Grand Boulevard, Madison, WI 52113 | Phone: 454.220.1234 | Fax: 454.220.1245

tech
Central Science Computer Tech

Dear Mr. Sangduck Seo

Iowa Technologies Corporation

1234 Park Avenue

Des Moines, IA 50202

Calendar
⚙️

2006
 ◀ February ▶

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

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www.cstech.com

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tech
Central Science Computer Tech

Dear Mr. Sangduck Seo

Iowa Technologies Corporation

1234 Park Avenue

Des Moines, IA 50202

Calendar
⚙️

2006
 ◀ February ▶

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21				

Prototype Design 3. Chat

02-11-2006 20:45

 Keywords

Contact
 Head (19)
 Sang-Duck Seo
 Andrew Jackson
 Kare Olson
 Bill Klinton
 Margaret ThatCher
 Jacob
 Michael Brown
 Jacob
 Emma Smith
 Sarah
 Jacob Johnson
 Sydney Jones
 Lauren
 Justin
 Jacob
 Grace Han
 Jacob
 Zachary
 Madison
 Dept 1 (34)
 Dept 2 (13)

Calendar
 2006 February ▶

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

IM Chat Sang-Duck Seo
 Video
 Voice
 Send File
 Memo
 Invite
 Help
 Jason Smith

Video Sang-Duck Seo
 Receiver Image
 Sender Image
 Microphone
 Speaker
 Volume
 Fullscreen
 Close


Footer
 uter Tech www.cstech.com
 Phone: 454.220.1234 | Fax: 454.220.1245

Dear Mr. Sangduck Seo

 Iowa Technologies Corporation
 1234 Park Avenue
 Des Moines, IA 50202

Skyward Meteorology Research Center provides advanced information solutions that capture and process vast amounts of data, produce essential information, and improve the decision making and operational performance of business and government organizations worldwide.

Prototype Design 4. Calendar



Calendar

2006
February

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Schedule | Monthly

Schedule | Daily	
2006	
HOR	FRIDAY
07 - 08	
08 - 09	
09 - 10	Meeting : Weekly Web Master Conference (R 50)
10 - 11	Presentation for the Web Design prototype - Banner and Poster Design - Diagram of NSP
11 - 12	Call: Confirmation for Printing Change Seco : 515 - 520 - 7169
12 - 13	

Schedule | Weekly

Prototype Design 5. E-mail Composition (Default)

02-11-2006 20:45

Contact

- Head (19)
- Sang-Duck Seo
- Andrew Jackson
- Kate Olson
- Bill Clinton
- Margaret Thatcher
- Jacob
- Michael Brown
- Jacob
- Emma Smith
- Sarah
- Jacob Johnson
- Sydney Jones
- Lauren
- Justin
- Jacob
- Grace Han
- Jacob
- Zachary
- Madison
- Dept 1 (34)
- Dept 2 (20)
- Dept 3(36)
- Friends (59)
- Family (6)
- Schools (20)

Keywords

M D Y -- M D Y

A Ss I Font Size Ital Color

Letters

Postcard

Cards

Template

To:

CC:

BCC:

Subject:

Attachment:

Address Book

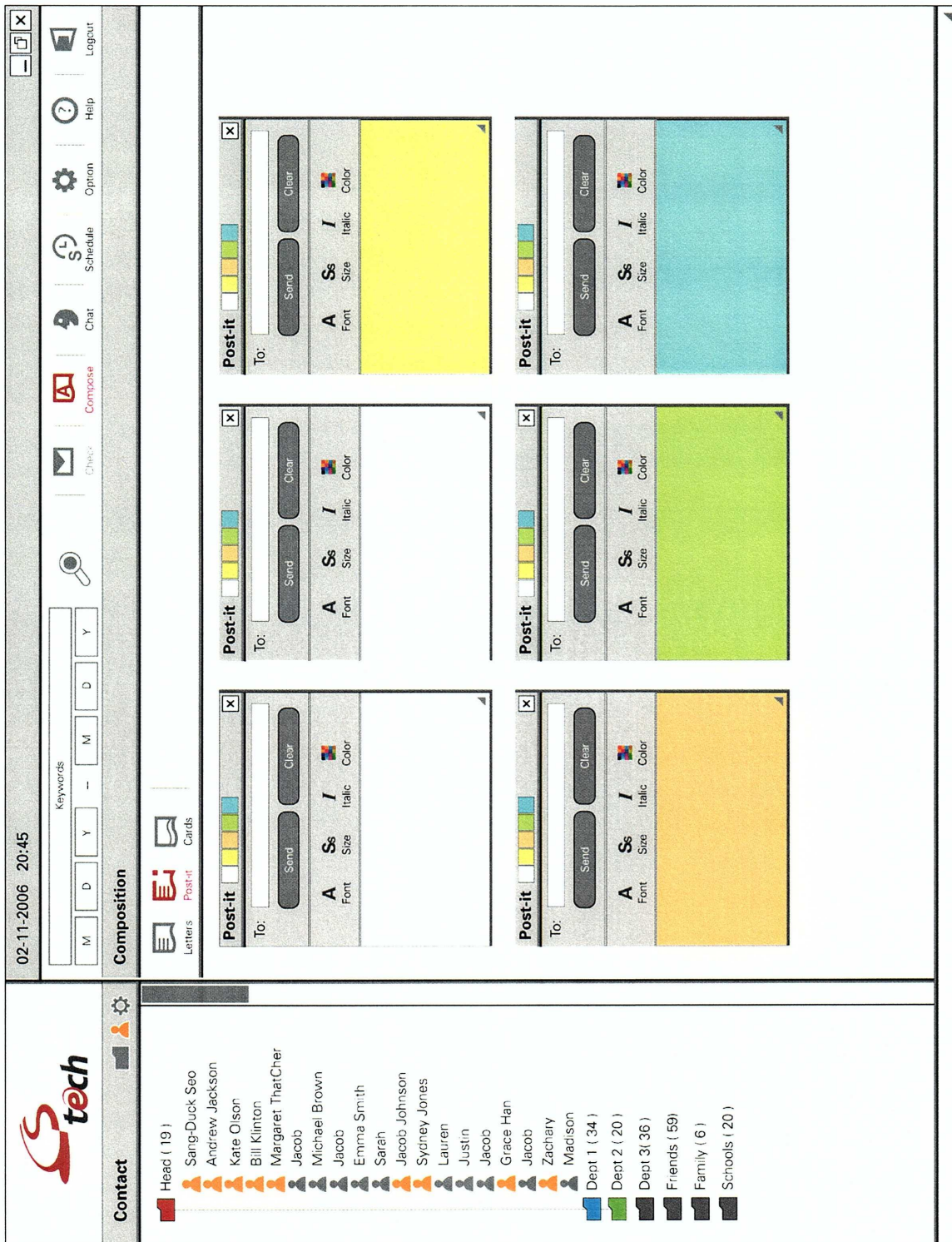
Send Draft Spell Check Clear

Composition

M D Y -- M D Y

Keywords
 Check
 Compose
 Chart
 Schedule
 Option
 Help
 Logout

Prototype Design 6. E-mail Composition (Post-it)



Prototype Design 7. E-mail Composition (Business Letter)

Contact

 Head (19)
 Sang-Duck Seo
 Andrew Jackson
 Kare Olson
 Bill Klinton
 Margaret ThatCher
 Jacob
 Michael Brown
 Jacob
 Emma Smith
 Sarah
 Jacob Johnson
 Sydney Jones
 Lauren
 Justin
 Jacob
 Grace Han
 Jacob
 Zachary
 Madison
 Dept 1 (34)
 Dept 2 (20)
 Dept 3(36)
 Friends (59)
 Family (6)
 Schools (20)

Keywords

M D Y - M D Y

Y D Y

Letters
 Post-it
 Cards
 Template
 A Ss Font Size Italic Color

Check
 Compose
 Chat
 Schedule
 Option
 Help
 Logout

To:

CC:

BCC:

Subject:

Attachment:

Address Book

Send Preview Draft Spell Check Clear

Load

Logo:

Name:

Address:

City / State / Zip code:

Phone:

Fax:

Signature:

Load the logo image

Type a sender's name

Street name and number

City / State / Zip code

Load the personal signature image

Type here

Prototype Design 8. E-mail Composition (E-Cards)

02-11-2006 20:45

Contact

- Head (19)
- Sang-Duck Seo
- Andrew Jackson
- Kate Olson
- Bill Clinton
- Margaret Thatcher
- Jacob
- Michael Brown
- Jacob
- Emma Smith
- Sarah
- Jacob Johnson
- Sydney Jones
- Lauren
- Justin
- Jacob
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Composition

Keywords: M D Y - M D Y

To: _____

CC: _____

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Subject: _____

Address Book

Setting

Background: Default

Animated Text: Move Left - Right

Sound: Emotion Happy

Font Default Size Default Color

Title

THANK YOU for everything!!

Contents

Order 1

Dear John,

I really appreciate your kindness and help in this semester.

This is not enough to say thank you for everything, but

Dear John,

Preview

[Full Size](#)

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